THE IRON TRADE REVIEW

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MAKING PROGRESS

IN ORDERLY READJUSTMENT OF CONDITIONS.

Only Moderate Amount of Business Developed—New Prices Being Well Maintained.

The readjustment of conditions following the recent declaration of an open market has proceeded in an orderly manner. While only a moderate amount of business has been developed, manufacturers are not showing the disposition of past years to take orders regardless of cost, and very careful estimating is being done to avoid selling at a loss. In spite of unconfirmed rumors to the contrary, the quotations on plates, shapes and steel bars are being well maintained. There is less talk concerning the making of Chicago a basing point but it is believed that prices will be based on Chicago if necessary to take orders. The Lackawanna Steel Co., which last week based its quotations on Buffalo, has returned to the Pittsburg base for the present at least.

Iron Ore Conditions. It is estimated that there are now about 14,000,000 tons of Lake Superior iron ore on docks and in furnace yards, and it is not surprising that furnaces are not showing much interest in the ore market. The prevailing sentiment among ore interests is strongly in favor of reaffirming last year's prices.

Machine Tools It is not to be expected that the recent reduction, sweeping as it is, will make its effect felt in all lines into which iron and steel enter. For instance, there seems to be no likelihood of a reduction in prices of machine tools, as the cost of the metal is a factor so insignificant that the steel reduction has little bearing on the situation. In this and other lines, there is a tendency to expect too much from the open market declaration.

Pig Iron Quiet. The production of pig iron continues at a greater rate than is justified by the demand, and some interests favor a general movement for the banking of all furnaces for 30 days, or the blowing out of many stacks. The demand is very limited, and in some cases, especially in the south, where iron is sold rather freely at $12 for No. 2, the situation is weak.

Demand Steel Bars. A very fair amount of business in steel bars has been developed, and no concessions have been made below the 1.20c price, Pittsburg, except on high carbon steel. A reduction of $2 a ton has been announced on bar iron, making the price 1.40c Chicago, Pittsburg and St. Louis, but some mills are willing to sell at 1.30c at their plants.

Structural Material Structural contracts of large tonnage are not numerous. The bookings of the American Bridge Co. for last month amounted to about 10,000 tons, and those of the independent interests to about 40,000 tons. The leading contracts of the week were as follows: The Hall of Records, Los Angeles, 2,800 tons, to the Llewellyn Iron Works, of that city; the building of the Brotherhood of Locomotive Engineers, Cleveland, 2,500 tons, to the King Bridge Co.; a loft building at Irving place and Sixteenth street, New York, 1,800 tons, to the Hay Foundry & Iron Works; bridge and lock gates for the Erie canal, 2,500 tons, to the Pennsylvania Steel Co.; the Stuyvesant apartments, New York City, 1,000 tons, to an independent interest; the Ferry building, Detroit, 1,100 tons, to the Russell Wheel & Foundry Co. In railroad work, the American Bridge Co. has booked 2,400 tons for track elevation for the Pennsylvania system of Chicago, and the McClintic-Marshall Construction Co. will furnish 3,000 tons for the Atlantic Coast line.

Wire and Plates. The wire business is in such a flourishing condition that no difficulty has been experienced in maintaining the old prices, and expected reductions have not been made. The same is true of tin plate. Orders for about 12,000 tons of plates have been taken by the leading interest, and a manufacturer of cars has placed an order for 7,000 tons of shapes. Rumors of orders for cars, including 8,500 for the B. & O. railroad, are current, but nothing definite in regard to them has developed. Independent interests have announced a reduction on black sheets of from $2 to $5; on galvanized, $4 to $6, and on corrugated roofing, $2 to $4. Reports of lower quotations are current.

Crude Steel. There has been considerable uncertainty as to prices of crude steel, but prevailing quotations have been established at $23 Pittsburg on rolling billets and $25 Pittsburg on sheet bars. In the east, rolling billets are sold at $23 at the mill, and the Chicago price is $23.50. It is understood that in all cases, full freight charges are to apply.

Coke and Old Material. One western consumer of foundry coke has contracted for 50,000 to 55,000 tons, and another for 10,000 tons at about $2.25 at the ovens. The old material market shows declining prices in nearly all centers.

THE WEEK IN IRON CENTERS

PITTSBURG.

Buyers Disposed to Move Slowly—Uncertainty as to Billets and Wire.

Office of THE IRON TRADE REVIEW, 510 Park Bldg., March 2.

The adjustment of the iron and steel industry to the changed conditions brought about by the declaration of an open market is continuing and in the meantime the consuming trade is drawing true bearings upon the situation. Generally any stimulating effect of the reduced level of prices is lacking up to this time, although in steel bars some buying of note is reported. Inquiries are increasing and consumers are showing a keener interest in developments, but there is a disposition to proceed cautiously until conditions are well settled.

In some products, notably semi-finished steel and wire material, considerable indefiniteness in the way of prices continues. The billet and sheet bar market especially is attracting the close attention of the manufacturing trade because of the relation it bears to other products and by reason of the interesting conditions which it presents. The sheet makers who do not produce their own steel are expecting the mills to make a readjustment of their running sheet bar contracts because of the reductions forced in sheets. In contrast to this position, tin plate makers are holding their own market firm and are desirous of having the prices on sheet and tin bars continue unchanged in order to avoid any re-arrangement of their own contracts already booked. In billets, the nominal market is now ruling above steel bars. The makers of billets and sheet bars for the merchant trade, which are largely numbered among the independents, have not yet indicated what action they will take.

Independent sheet manufacturers at a meeting in Pittsburg Tuesday, determined to clear the situation in their product and announced reductions of from $2 to $5 in black sheets, $4 to $6 in galvanized and $2 to $4 in corrugated roofing. Bar iron makers have established prices of 1.40c Pittsburg, 1.40c Chicago and 1.40c St. Louis, which represent a reduction of $2 a ton.

Pig Iron.—Average selling prices of Bessemer and basic iron for February have been announced as $15.875 and $15.185 respectively, or $16.77 and $16.08 Pittsburg comparing with $17.40 and $16.40 Pittsburg in January. The market generally is dull with the interest of melters centering mainly on small lots for prompt shipment.

Prompt Bessemer is quoted at $15.50 valley and we note carload sales at that price. A lot of 300 tons of basic for immediate delivery was sold this week but the transaction was without market significance. For this grade $15 valley is asked.

The Republic Iron & Steel Co. has blown out its Hall furnace at Sharon, Pa., and its Atlantic furnace at New Castle, Pa.

On prompt and first half shipment on northern iron, we quote as follows:

Bessemer, valley	$15.50 to 16.00
Bessemer, Pittsburg	16.40 to 16.90
No. 2 foundry, Pittsburg	15.90 to 16.15
Gray forge, Pittsburg	15.25 to 15.50
Basic, valley	15.00 to 15.25
Basic, Pittsburg	15.90 to 16.15

Ferro-Alloys.—The ferro-alloy market is in a very quiet state and prices are nominal. Some inquiry is out for ferro-manganese for prompt shipment.

We quote nominally 80 per cent ferro-manganese at $43.50 to $44 seaboard with a freight rate of $1.95 to Pittsburg.

Imported 50 per cent ferro-silicon is quoted at $62 to $62.50 Pittsburg on forward deliveries; domestic 12 per cent, $27; 11 per cent, $26; 10 per cent, $25, Pittsburg.

Plates.—The Baltimore & Ohio railroad is considering the purchase of a large block of freight cars of steel construction estimated at about 8,500 in number, but the proposition is still in a tentative stage and only advance reports of it have reached the market. No particular change has come over the plate market since the establishment of the 1.30c basis. Current specifications have been adjusted to the new price and are running at about the usual volume. No large new contracts of note have been booked. The following prices represent the present market:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.30c f. o. b. mill. Extras are as follows per 100 pounds: Boiler and flange steel plate, 0.10c; A. B. M. A. and ordinary fire box steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edges, 0.10c; under 3/16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms. net cash in 30 days.

Sheets.—At a meeting of the representative independent sheet makers of the country at the Hotel Lincoln in this city Tuesday, the general sentiment prevailed that the best interests of the trade demanded the market should be cleared of its present indefiniteness. As a consequence, new official quotations involving reductions of from $2 to $6 a ton were announced to the consuming public. The cuts made range from $2 to $5 in black sheets, $4 to $6 in galvanized and $2 to $4 in corrugated roofing. The market as established by the independents applies only to specifications and no contracts will be accepted at these rates. Only a limited volume of new sheet business has been closed since the open market was declared. The operations of the American Sheet & Tin Plate Co. are around 40 per cent while the average activity of the independents is approximately 75 per cent.

We quote the following official prices of the independents in carload lots, with the usual differentials on less than carloads: Black sheets, Nos. 13 and 14, 2c; Nos. 15 and 16, 2.05c; Nos. 17 to 21, 2.10c; Nos. 22 to 24, 2.15c; Nos. 25 and 26, 2.20c; No. 27, 2.25c; No. 28, 2.30c; No. 29, 2.35c; No. 30, 2.45c; galvanized sheets, Nos. 13 and 14, 2.35c; Nos. 15 and 16, 2.45c; Nos. 17 to 21, 2.55c; Nos. 22 to 24, 2.70c; Nos. 25 and 26, 2.90c; No. 27, 3.10c; No. 28, 3.30c; No. 29, 3.40c; No. 30, 3.65c; painted roofing, $1.65 per square for No. 28 gage, 2½-inch corrugation, and galvanized roofing $2.90 per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—Under present conditions, makers of tin plate are holding to similar opinions and the market is being maintained at the former price of $3.70 Pittsburg per base box and $3.65 Pittsburg in large lots which has ruled since Jan. 6, 1908. Until a change in sheet and tin bar prices is brought about, it is expected that the market will hold to this level as much of the season's business is already upon the books of both the tin

plate makers and the can manufacturers. Specifications in tin plate have been received in good volume during the past few days. The mills of the leading interest are running at 68 per cent of their total capacity. Of the active independent mills, more than 90 per cent is going. We quote the present price on tin plate as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.70 f. o. b. mill Pittsburg district and $3.65 in large lots. Terms, 30 days, less 2 per cent for cash in 10 days.

Steel.—No official change of prices has been announced in either billets or sheet bars, though reports are current of business having been taken at reduced quotations. Billets at the nominal price of $25 Pittsburg are out of line with steel bars, upon which the open market is $24 net ton. The great majority of the billet consumers are under contract and there is little new business being offered by which to establish the market. The sheet bar situation is especially interesting since the buyers of this material, those sheet and tin plate makers who do not make their own steel, are in marked contrast in their desires. The sheet manufacturers have already reduced their prices and those to whom the mills have been furnishing steel are expecting a readjustment of these contracts now in force. The tin plate makers on the contrary want the market held at the old price of $27 Pittsburg or $27.50 delivered in Pittsburg, valley or Wheeling territory, as they hope to avoid any readjustment of contracts for their own material. The situation is largely in the hands of the independent steel makers, as the Carnegie Steel Co. diverts its main tonnage of sheet bars to the American Sheet & Tin Plate Co.

Rails and Track Material.—The rolling orders against the Pennsylvania, Baltimore & Ohio, Pittsburg & Lake Erie, and other recent contracts for standard sections placed by steam roads, are coming to the mills, and there is some scattering new business of small tonnage being taken. The light rail sitaution shows no further developments, and the condition of the mills rolling from billets meeting the prices of rerollers still prevails. The bookings of the Carnegie Steel Co. during the past week totaled about 1,200 tons. On present specifications on Bessemer rails we quote as follows, the base price for open-hearth rails being $30 mill:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $32; 12-pound, $29; 16-pound, $27; 20-pound, $26; 25 to 45-pound, $25; angle splice bars for standard sections, 1.50c.

Hoops and Bands.—The lower prices on hoops and bands have not brought out much new business, as the contracts of the coopers which were extended in some cases at the first of the year are still running. We quote present prices as follows:

Hoops in carload lots, 1.60c; in less than carload lots, 1.70c; bands, 1.20c, base half extras as per standard steel.

Merchant Bars.—Western bar iron makers have established new prices of 1.40c Pittsburg, 1.40c Chicago and 1.40c St. Louis, which represents a cut of $2 a ton from the former level, as against the $4 reduction made last week in steel bars. The spread between iron and steel bars is now $4 a ton, due to the higher cost of production at the present scrap market, instead of $2 which had formerly held. Little new business has been taken at the lower prices. Some steel bar orders have followed the lowering of the price to 1.20c mill, and some makers report a nice tonnage having been booked. We quote present prices as follows: Common iron bars, 1.40c Pittsburg, 1.40c Chicago, and 1.40c St. Louis in carload lots and over; 1.45c in less than carloads. Bessemer and open-hearth steel bars, 1.20c; plow and cultivator, 1.20c; channels, angles, zees, tees, under 3-inch, 1.30c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance.

Structural Material.—The general price of 1.30c on structural shapes has been discounted by lower fabricating quotations in competition, so that the latter manufacturers find the situation for them has not improved. There are reports that lower than 1.30c has been done on attractive shape business, but it has not been clearly established that such is the case. The market is considerably unsettled and some pending construction jobs are held up. The Jones & Laughlin Steel Co. has taken the Flaccus building in this city, about 150 tons. The building of the Brotherhood of Locomotive Engineers at Cleveland, about 2,000 tons, has gone to the King Bridge Co. We quote the present market on structural shapes as follows:

Beams and channels, 15-inch and under, 1.30c; over 15 inches, 1.40c; zees, 1.30c; tees, 1.35c; angles from 3 to 6 inches, 1.30c; over 6 inches, 1.40c; universal and sheared plates, 6¼ inches and wider, 1.30c base.

Merchant Pipe.—Some forerunners of business are to be noted in merchant pipe, as it is generally believed that prices have reached the low point. The sentiment in this line is good and some business is expected to be brought out soon. There are few contracts in merchant pipe, and any adjustment to the new prices has been limited. Other principal makers of iron and steel pipe have followed the lead of the National Tube Co. in issuing new cards, showing reductions of $6 to $10 in wrought steel pipe and $2 to $4 in iron pipe. We quote the following official discounts on steel pipe subject to five off to jobbers, while a few of the very many large jobbers are given an additional one point off:

	Black.	Galv.
⅛ and ¼ inch	72	56
⅜ inch	73	59
½ inch	76	64
¾ to 6 inch	80	70
7 to 12 inch	75	60
PLUGGED AND REAMED.		
1 to 4 inch	78	68
EXTRA STRONG PLAIN ENDS.		
⅛ to ⅜ inch	65	53
½ to 4 inch	72	60
4½ to 8 inch	68	56
DOUBLE EXTRA STRONG PLAIN ENDS.		
½ to 8 inch	61	50

On wrought iron pipe to jobbers in carloads the official discounts are as follows:

	Black.	Galv.
⅛ and ¼ inch	67	51
⅜ inch	68	54
½ inch	71	59
¾ to 6 inch	73	65
7 and 8 inch	70	55
PLUGGED AND REAMED.		
1 to 4 inch	73	63
EXTRA STRONG PLAIN ENDS.		
⅛ to ⅜ inch	60	48
½ to 4 inch	67	55
4½ to 8 inch	63	51

Boiler Tubes.—The recent reductions in boiler tubes have discounted the shading of prices which had formerly existed, but owing to the light power construction and the cautious buying by the railroads, a quiet trade still continues. We quote the following official discounts on steel boiler tubes to jobbers in carload lots:

1 to 1½ inch	50
1¾ to 2¼ inch	62
2½ inch	64
2¾ to 5 inch	70
6 to 13 inch	62

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

LESS CARLOADS

To destinations east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg, Pa.

Wire Products.—Though new schedules on wire products have been expected from the American Steel & Wire Co., none has yet been issued and the market is in an indefinite state. Business as a consequence is being held back, but as the season for the spring trade in wire products is at hand, it is believed that developments will be brought about soon. The former official jobbers' prices in carloads of $1.95 on wire nails, $2.10 on painted barb wire, and $1.80 on plain wire, are reported as being shaded 5 cents or $1 a ton.

Wire Rods.—There have been no announcements in wire rods and the nominal market continues $33 Pittsburg on Bessemer and $34 Pittsburg on open-hearth rods.

Coke.—The coke market is in a very quiet condition and inquiries and sales are light. We quote spot furnace coke at $1.60 to $1.75 ovens and on contract from $1.75 to $1.90 ovens. On first class Connellsville foundry coke for shipment up to the second half, the price range is from $2 to $2.25 ovens. Beyond that time a higher price is asked. The *Courier's* figures for the week ending Feb. 20 show 24,002 active ovens with a production of 265,619 tons, compared with 24,066 active ovens and a production of 268,958 tons the previous week.

Old Material.—Sharp declines in old material have been shown by the few scattering sales made. At present the demand is extremely light and the market is largely in a nominal state so that the disposition of the February accumulations of the railroads is awaited with interest. The Pennsylvania lines west close March 3 on their list of about 4,000 tons comprising 650 tons of No. 1 wrought, 900 tons of steel, 1,700 tons of long rails and scattering grades. We quote gross tons in the Pittsburg district as follows:

Heavy melting scrap, $14.50 to $15; re-rolling rails, $15 to $15.50; bundled sheet scrap, $11.50 to $12; iron axles, $20 to $21; old iron rails, $16.50 to $17; No. 1 wrought scrap, $15 to $15.50; old car wheels, $15 to $15.50; low phosphorus, $16.75 to $17.25; machine shop turnings, $10 to $10.50; cast borings, $8 to $8.50; No. 1 cast scrap, $14 to $14.50; malleable, $14 to $14.50; stove plate, $11 to $11.50.

CHICAGO.

Policy of Basing Prices at Chicago Will be Adopted if Necessary.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, March. 2.

The events of the past week have served to establish with some clearness the character of the sales policy inaugurated with the reduction of prices on Feb. 19. The essential object sought, in pursuit of which the price reductions were authorized, was the protection of self interest, particularly by the Steel Corporation. Developments indicate that while the Corporation was correspondingly the most aggressive in presenting the new prices to customers, efforts have been directed almost entirely toward the repair of damages inflicted by price cutting invasions prior to Feb. 19. As a matter of fact there was considerably less evidence last week of customers being diverted from their habitual sources of supply by the inducement of lower prices than for several weeks prior to the general reductions. There is apparent no disposition on the part of any interest to force the issue or to corral business by methods of price sacrificing. That price cutting which was most troublesome prior to the making of reductions was well located and it was fairly clear upon what price basis those interests might be eliminated from the market as cutters under any condition save that of a price war. That the new level first offered namely 1.20c for steel bars, and 1.30c for shapes and plates, all f. o. b. Pittsburg, has been sufficient to meet all the needs of the case and has been deviated from scarcely at all, is corollary to the fact that there is no price war and little if any bitterness. But an exceedingly heavy club hangs in the air. The leading interest has greatly increased the authority of the sales departments of its subsidiaries. They have been given authority to meet the situation. From this new status has developed the possibility of Chicago as a basing point. The local subsidiary of the Corporation has quoted and is at liberty to quote f. o. b. Chicago such prices as are required to hold its own business or to obtain that for which it may legitimately be a competitor. The effect upon mills east of Chicago, should this privilege become operative, is very apparent. The range of influence would depend upon the differential established. The fact that the prices now being quoted are still Pittsburg prices plus freight to Chicago indicates clearly that the leading interest is not anxious to reduce the natural profits it may enjoy unless forced to. From the standpoint of the consumer, most of the prices now in effect are fair and from the standpoint of the producer common sense would seem to dictate their firm establishment. Whatever unsettled feeling still exists in the minds of buyers may be attributed either to the tariff discussion or to the fact that what are commonly considered commensurate reductions have not been established for all of the market products. Billets in particular are an evidence of the latter. The lack of any pressing inquiry may be accepted as the reason for the billet situation and for sheet bars as well. In the case of wire products, the trade is doing so nicely it may well be taken by itself and handled according to the policy of "let well enough alone." Whatever may be done with those prices which have not been reduced is not likely to affect the prices already reduced. With regard to the tariff, the disconcerting effect of its discussion must be admitted, but at the same time it is equally true that the extent of the reduction to be made will diminish greatly when transmitted from the tariff schedules to finished prices. The contracting at the lower prices has been very moderate and specifications are recovering but slowly from the retarding effect of the reductions.

Pig Iron.—The pig iron market is exceedingly quiet. A very few inquiries are being received, none of which is necessarily significant of intent to buy or is for large tonnage. The lack of transactions of standard character makes it difficult to determine what a ruling price would be at present. For southern iron not over $12.50 could be obtained by Birmingham furnaces and it is very probable business would be accepted at 50 cents below that price, if necessary. What might be done by the close buyer is wholly a matter of conjecture. The situation certainly is not strong. Local furnaces are standing behind the price of ore as the bulwark of their defence against lower prices, and at the present time indications all point to no reduction of the ore price. Whatever reasons may be urged for lower pig iron prices should not be based upon the decline in steel. Pig iron declined in price last year sufficiently to preserve the proper relation to steel prices at the lower level just reached. What the northern furnaces will do with regard to holding the price at $17 furnace depends entirely on their ability to outlast the stagnant market. The delay of iron shipments is quite extensive. We quote as follows, for delivery at Chicago plants:

Lake Superior charcoal	$19.50 to 20.00
Northern foundry No. 1	17.00 to 17.50
Northern foundry No. 2	16.50 to 17.00
Northern foundry No. 3	16.00 to 16.50
Southern foundry No. 1	16.85 to 17.35
Southern foundry No. 2	16.35 to 16.85
Southern foundry No. 3	15.85 to 16.35
Southern foundry No. 4	15.35 to 15.85
Southern No. 1 soft	16.85 to 17.35
Southern No. 2 soft	16.35 to 16.85
Southern gray forge	15.35 to 15.85
Southern mottled	15.10 to 15.60
Southern silveries, 4 per cent silicon	17.60 to 18.10
Southern silveries, 5 per cent silicon	18.10 to 18.60
Southern silveries, 6 per cent silicon	18.60 to 19.10
Jackson Co. silveries, 6 per cent.	19.40 to 19.90
Jackson Co. silveries, 8 per cent.	20.40 to 20.90
Jackson Co. silveries, 10 per cent	21.40 to 21.90
Malleable Bessemer	16.50 to 17.00
Standard Bessemer	17.40 to 17.90
Alabama basic	16.85 to 17.35

Billets.—A rather surprising tardiness and a disinclination to offer anything in the way of new prices seem to possess billet manufacturers. A sale of a carload lot is reported at the former prices, but a purchase of about 1,800 tons at the end of last week by the International Harvester Co. for eastern delivery was at a considerably better price. The hesitancy in establishing a new position with regard to billet prices has been made easy by the lack of any pressing inquiry, but it is generally assumed that 4 x 4-inch rolling billets will be held at $23.50 and forging billets at $25 base, Chicago.

Merchant Bars.—With respect to steel bars the disturbances of a week ago noticeably have subsided. Specifications perhaps have not entirely regained their stride, though recovery can be noted in that direction. More important is the fact that the price situation offers few, if any, deviations from the basis of 1.20c Pittsburg. Few occasions have required that better than this price be done by either the Corporation or independents, and no business is being voluntarily sought with concessions from this level as an inducement. The tonnage which has been placed is very limited, as might be expected from the fact that the season for steel bar contracting is still some 60 days in the future and no contracts are being entered into covering deliveries beyond July 1. High carbon steel bars have been sold under more severe pressure and prices have withstood conditions less strongly. As low as 1.20c Chicago is understood to have been done on hard steel bars and between this price and 1.30c a slight premium over steel, is problematical. The action of the Western Bar Iron Association in consenting to a reduction of only $2 a ton despite the fact that the relative positions of iron and steel as to premium were reversed is generally commended by bar iron manufacturers and in the present state of trade will not be a matter of great import to the consumer. Prices of machinery and implement steel have been reduced $4 a ton in line with bars. We have revised our prices and quote as follows for Chicago delivery:

Bar iron, 1.40c; soft steel bars and bands, 1.38c, half extras; soft steel angles, less than 3 x 3, 1.48c; hoops, 1.78c base, full extras; planished or smooth finished tire steel, 1.58c; iron finish, up to 1½ x ½-inch, 1.53c base tire card; iron finish, 1½ x ½-inch and larger, 1.38c base steel card; channel for solid rubber tire, ¾ to 1 inch, 1.88c and 1⅛-inch and larger, 1.78c; smooth-finished machinery steel, 1.63c; flat sleigh shoe, 1.43c; concave and convex sleigh shoe, 1.63c; cutter shoe, 2.75c; toe calk steel, 1.93c; railway spring, 1.73c, base steel card; vehicle spring steel, 1.78c base vehicle card; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 57 per cent off the list for carload lots, and 52 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.80c to 1.90c, full extras; soft steel bars, 1.60c per 100 pounds base, plus half extras; soft steel hoops, 2.10c full extras.

Plates.—The result of a week's operating under the new schedule resulted in the placing of over 12,000 tons of plates by the leading interest. In this tonnage were orders for 2,000 tons and for 8,000 tons and several orders for small lots. No difficulty was experienced in taking this business at 1.48c Chicago, which is the Pittsburg base price plus freight and, while offers of a price $1 below this were reported, there is evidence supporting the belief that there was too little variation from the 1.30c Pittsburg price to be worthy of mention. Prior to Feb. 19 two Pennsylvania independent plate mills were selling in this territory at $1.68 delivered or $2 below the schedule. With a freight rate of 28 cents against them, the now prevailing price of 1.48c will eliminate them from this market and as they were the only mills able to roll the heaviest plates which showed a disposition to shade, the situation here on the basis of the new price appears to be very strong. Tonnages of plates placed with mills other than those of the leading interest were not large. We have revised our prices and quote on the basis of 1.30c f. o. b. Pittsburg, as follows:

Plates, ¼-inch and heavier, 6¼ to 100 inches wide, either universal or sheared, 1.48c Chicago. For extras see Pittsburg report. Shippers' prices for shipment from local stocks are as follows: Tank steel, ¼-inch and heavier, up to 72 inches wide, 1.70c to 1.80c; from 72 inches to 96 inches wide, 1.80c to 1.90c; 3/16-inch up to and including 60 inches wide 1.80c to 1.85c; 72 inches wide, 2.05c to 2.10c; No. 8, up to 60 inches wide, 1.80c to 1.85c. Flange and head quality, 25c extra.

Sheets.—Specifications on sheet contracts recovered rapidly from the confusion of adjustment and the tonnage being released is in fairly satisfactory volume. The matter of sheet prices, while still susceptible to influences which may develop, is pretty well defined for the present and shipments from both mill and store are now on a regular schedule. Such irregularities as still exist have to do with modifications in extras for widths and lengths in which there is a leeway of as much as $4 a ton. In general, the reductions are $3 a ton on blue annealed, $4 a ton on box annealed and $5 a ton on galvanized for mill shipments. Store prices are off from $1 to $2 a ton. For reference we quote the full line of prices from mill and store as follows:

Chicago prices: Blue annealed—No. 10, 1.83c; No. 12, 1.88c; No. 14, 1.93c; No. 16, 2.03c. Box annealed—Nos. 17-21, 2.18c; Nos. 23-24, 2.23c; Nos. 25-26, 2.28c; No. 27, 2.33c; No. 28, 2.38c; No. 29, 2.43c; No. 30, 2.53c. Galvanized—No. 14, 2.43c; Nos. 15-16, 2.53c; Nos. 17-21, 2.68c; Nos. 22-24, 2.83c; Nos. 25-26, 3.03c; No. 27, 3.23c; No. 28, 3.43c; No. 29, 3.58c; No. 30, 3.83c.

Store prices at Chicago: No. 10, 2c to 2.10c; No. 12, 2.05 to 2.15c; No. 14, 2.10c to 2.20c; No. 16, 2.20c to 2.30c; Nos. 18-20, 2.50c to 2.55c; Nos. 22-24, 2.55c to 2.60c; No. 26, 2.60c to 2.65c; No. 27, 2.65c to 2.70c; No. 28, 2.75c to 2.80c; No. 30, 3.05c; galvanized sheets, Nos. 10 to 16, 3c to 3.10c; Nos. 18 to 20, 3.05c to 3.15c; Nos. 22 to 24, 3.20c to 3.25c; No. 26, 3.40c to 3.45c; No. 27, 3.60c to 3.65c; No. 28, 3.80c to 3.90c; No. 30, 4.20c to 4.50c.

Structural Steel.—It is doubtful if contracts aggregating more than 20,000 tons were placed in Chicago last week and the amount may have been slightly under that figure. Much the same selling conditions prevailed in connection with shapes as with bars and plates and 1.30c Pittsburg was the ruling price. A good tonnage of inquiries is in the market, but hesitancy in placing contracts is still in evidence. Several contracts for fabricated work were placed in the week, but no rush of contracting has developed. The contract for the Hall of Records, Los Angeles, carrying 2,808 tons, was let to the Llewellyn Iron Works of that city, for $175,000. Milliken Bros. took the contract for 525 tons for St. Mary's hospital at San Francisco and the Ralston Iron Works will fabricate 414 tons for A. Funckenstein, also in San Fran-

cisco. The consideration was $31,000 erected. The pier at Pearl Harbor, Honolulu, for which tenders were asked, brought out figures greater than the appropriation and new bids will be asked. Bids are being opened this week on 2,314 tons for the new court house at Omaha, and it is expected that the Northern Pacific tonnage of about 8,000 tons, which was temporarily withdrawn, will be placed next week. We have revised our prices and quote as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.48c, delivered Chicago. For extras see Pittsburg report. Quotations from store are as follows for carload lots and over:

All angles, 3 inches and larger, including 6 inches, $1.70 per 100 pounds; angles over 6 inches, $1.80 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.70 per 100 pounds, base; channels, 3 inches and larger, $1.70 per 100 pounds base. Less than carload lots are $1 a ton higher than foregoing prices.

Rails and Track Supplies.—With the exception of an inquiry for from 8,000 to 10,000 tons of rails now pending, attention seems to have been diverted very largely from railroad buying for trackwork by the other events of the week. There is, as a result, little of interest to report in this connection. No suggestion of a change in prices is current and we continue to quote as follows:

Standard Bessemer rails, $28; open-hearth, $30, f. o. b. mill in 500-ton lots and over; less than 500 tons, $2 extra, full freight to destination; light rails, 25-pound to 45-pound, $26; 20-pound $27; 16-pound, $28; 12-pound, $29. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; spikes, 1.80c to 1.90c; track bolts, with square nuts, 2.15c to 2.25c; with hexagon nuts, 2.30c to 2.40c. Small railroad and square boat spikes, 1.90c base, f. o. b. Chicago.

Merchant Pipe.—The reductions in prices of steel pipe predicted a week ago have been put into effect and we quote accordingly. Thus far the tonnage in tubular goods has failed materially to increase, but there are evidences of the development of a very satisfactory spring trade. We quote mill discounts as follows. Store prices are off two points. Mill discounts are f. o. b. Pittsburg plus freight to Chicago.

Cast Iron Pipe—The price of cast iron pipe, affected as it is, by pig iron rather than steel, has suffered no change. The current lettings include one for 1,000 tons at Bisbee, Ariz. March 2; 1,000 tons at Cincinnati, March 3, and one for 45,000 tons at San Francisco, March 10. This latter letting has been mentioned before and represents the installation of a new high pressure system for San Francisco. It is also reported that the city of Cheyenne, Wy., is to be ready to place the contract for the water system to Fort Russell in about 60 days. There will be about 20,000 tons in this contract. We quote as follows: 4-inch. water pipe, $23; 6 to 14-inch, $27; larger sizes, $26; gas pipe, $1 a ton higher.

Wire Products.—Where at one time it seemed that reductions in wire products would follow the reductions in other steel products, the reverse conditions are now established and there is reason to believe that from the standpoint of the manufacturers the situation is stronger at the prices which have prevailed than it was before. Independent interests which are inclined to shade prices are now adhering strictly to the schedule. An incipient outbreak of cutting on the part of certain jobbers which has not yet subsided, but which can hardly develop into anything serious, is the only weakness. Orders and specifications have not been greatly disturbed. We quote as follows:

Wire nails, jobbers' carload lots, $2.13; retailers' carload lots, $2.18; painted barb wire, jobbers' carload lots, $2.28; retailers' carload lots, $2.33, with 30c for galvanizing; plain wire to jobbers in carloads, 1.98c, and to retailers in carloads, $2.03. Wire rods, Bessemer, $33; open-hearth, $34; chain rods, $33, f. o. b. Pittsburg.

Old Materials.—Despite the fact that transactions by which prices may be absolutely fixed are exceedingly few, it is apparent beyond the possibility of error from the prices that are offered that the scrap market has suffered declines on all grades of material ranging from 50 cents a ton to $2. Consumers of scrap are very chary of buying while the real value of scrap is difficult to determine or until the status of finished products shall have been clearly ascertained. The prices quoted below are based in a measure upon prices offered or accepted for material last listed by the railroads. The further trend of prices will depend very largely upon the decision of the railroads with regard to selling their scrap at the going prices. The less scrap appearing in the market either from the railroads or dealers' stocks, the greater chance for the preservation of what strength still remains in the market. We have revised prices and quote gross tons in the first paragraph as follows:

Old car wheels	$15.00 to 15.50
Old iron rails	18.25 to 18.75
Re-rolling rails (4 ft. and over)	13.00 to 13.50
Old steel rails (4 ft. and under)	13.50 to 14.00
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	19.00 to 19.50
Frogs, switches and guards	12.50 to 13.00
Heavy melting steel	12.50 to 13.00

We quote, net tons, as follows:

No. 1 R. R. wrought	$12.00 to 12.50
No. 2 R. R. wrought	11.00 to 11.50
Knuckles, couplers and springs	11.75 to 12.25
Shafting	15.75 to 16.25
Iron car axles	18.00 to 18.50
Steel car axles	16.75 to 17.25
Dealers' forge No. 1	9.50 to 10.00
Pipes and flues	9.00 to 9.50
No. 1 cast, 150 lbs. and less	12.25 to 12.75
No. 1 mill	7.25 to 7.75
Mixed busheling (Nos. 1 and 2)	7.25 to 7.75
Country sheet	5.00 to 5.50
No. 1 boiler cut	9.00 to 9.50
Boiler punchings	11.00 to 11.50
Cast borings	6.00 to 6.50
Mixed borings, etc.	6.00 to 6.50
Machine shop turnings	7.00 to 7.50
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.00 to 11.00
Stove plate and light cast scrap	11.25 to 11.75
Old iron splice bars	15.00 to 15.50

CLEVELAND.

New Prices on Bars and Shapes are Being Maintained.

Office of THE IRON TRADE REVIEW,
Browning Building, March 2.

Iron Ore.—It is estimated that there are now about 14,000,000 tons of ore on docks and in furnace yards, and it is not surprising that furnace men are not showing any particular interest in the ore market. There has been no formal discussion of ore prices, but the prevailing sentiment is strongly in favor of reaffirming last year's prices. The movement from docks to furnaces is somewhat heavier than it was at this time last year. On base ores, with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—With the exception of one inquiry for 4,000 tons of basic from Erie, Pa., no business of importance is pending. Foundries are buying only in very small quantities for current needs. It is evident that the production of pig iron in this district is heavier than is justified by the demand, and it is probable that some furnaces will be blown out very soon unless conditions show improvement. We quote delivered in Cleveland as follows:

No. 1 foundry	$16.50 to 16.75
No. 2 foundry	16.00 to 16.25
No. 3 foundry	15.50 to 15.75
No. 2 southern	16.35 to 16.85
Gray forge	13.75 to 14.00

Bessemer	16.50 to 16.75
Lake Superior charcoal	19.50 to 20.00
Jackson Co. 8 per cent silvery	20.05

Coke.—The coke market is in the same lifeless condition that has existed for many weeks. We quote furnace at $1.50 to $1.60, and foundry at $2 to $2.25 for prompt shipment. On contract, we quote foundry coke at $2.25 to $2.40, and furnace coke $1.75 to $1.80.

Finished Materials.—Compared with the conditions existing during the two or three days following the announcement of reduced prices, business shows some improvement, as mills have received a fair number of orders for moderate tonnages covering a wide range of products. There is, however, no heavy buying, and the future remains uncertain. Prices on nuts and bolts have been reduced five per cent, in harmony with the lower prices on bars. On steel bars, the quotation of 1.20c Pittsburg is being firmly maintained, as is also the 1.30c price on shapes. The price of bar iron seems to be uncertain, as very little business is being transacted, but probably no difficulty would be experienced in buying at 1.30c Cleveland. The contract for 400 tons of bars for the foundation for the new Corrigan-McKinney furnace has been awarded to the leading interest. The contract for the new building of the Brotherhood of Locomotive Engineers, involving about 2,500 tons of steel, has been awarded to the King Bridge Co. The contract for the steel has not been awarded. Jobbers report that business is very dull. Very little is heard now of basing prices on Chicago as well as Pittsburg, and it seems probable that the Pittsburg basis will prevail.

Old Material.—Further softening of the market has taken place except in heavy steel and country mixed steel, prices being reduced from 50 cents to $1 a ton. Buyers in the Cleveland district are still chary somewhat of quoted prices and are taking material only in a hand-to-mouth sort of way. We quote f. o. b. Cleveland as follows:

Old iron rails	$16.50 to 17.00
Old steel rails (re-rolling)	14.50 to 15.00
Old steel rails (under 6 feet)	14.50 to 15.00
Old car wheels	14.50 to 15.00
Old steel boiler plate	12.00 to 12 50
Malleable iron (railroad)	13.50 to 14.00
Steel axles	18.00 to 18.50
Malleable iron (agricultural)	12.50 to 13.00
Heavy steel	13.50 to 14.00
Country mixed steel	12.00 to 12.50
Low phosphorus	16.00 to 16.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$13.50 to 14.00
No. 1 busheling	11.50 to 12.00
No. 1 machine cast	12.50 to 13.00
Iron axles	17.00 to 17.50
Axle turnings	9.50 to 10.00
Machine shop turnings	7.50 to 8.00
Grate bars	11.00 to 11.50
Pipes and flues	10.50 to 11.00
Tank iron	9.00 to 9.50
Hoop and band iron	7.00 to 7.50
Sheet iron	5.50 to 6.00
Wrought drillings	7.50 to 8.00
Stove plate	11.00 to 11.50
Cast borings	6.00 to 6.50

CINCINNATI.

Pig Iron Market Unsettled and Prices Tending Downward.

Office of THE IRON TRADE REVIEW, First National Bank Bldg., March 2.

Pig Iron.—The market remains in an unsettled condition, business is light and lower quotations are being made. On southern iron, quotations range from $12 to $12.50 Birmingham for No. 2 foundry. It is not clearly established that $12 Birmingham prices are being made by furnace interests, but the market is recognized as having receded to that point. In the Ironton district, quotations are now $14.50 to $15 for No. 2 foundry at furnace. The concessions appear to have been made in the hope of securing business, but in this territory inquiry is light. Some good inquiries are reported from St. Louis, notably one for 2,000 tons of gray forge, and 2,000 tons of No. 3 foundry; there is also some good malleable inquiry; but sales agencies have the impression that the inquiries are merely made in an effort to locate the market and that purchases at this time are unlikely. The decline in prices in the Ironton district has been somewhat of a surprise to the trade and has resulted in considerable discussion of furnace costs. It is claimed by some that it is doubtful whether iron can be produced in that district to sell at a profit at $14.50 furnace. It is difficult to locate inside figures on the lower grades of southern iron, and southern gray forge, while quotable at $10.50 and $11, might be difficult to find at the inside price. No. 4 foundry is regarded as quotable at $11.25 to $11.50, but the lower price might only be put through on a firm offer for immediate shipment. Consumers are making some effort to get prices for the last half, but there are no open prices quotable for last half delivery at this time, and anything that might be done on a contract covering this period would be a matter of special negotiation.

We quote for prompt delivery, delivered Cincinnati, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, as follows:

Southern foundry No. 1	$15.75 to 16.25
Southern foundry No. 2	15.25 to 15.75
Southern foundry No. 3	14.75 to 15.25
Southern foundry No. 4	14.50 to 14.75
Southern No. 1 soft	15.75 to 16.25
Southern No. 2 soft	15.25 to 15.75
Southern gray forge	13.75 to 14.25
Northern No. 1 foundry	16.20 to 16.70
Northern No. 2 foundry	15.70 to 16.20
Northern No. 3 foundry	15.20 to 15.70
Northern 8 per cent silicon	19.70

Finished Materials.—Steel bars in this market appear to be fairly well established at 1.20c Pittsburg, with structural and plates at 1.30c Pittsburg. Hoops, 1.60c Pittsburg for carload lots. It is said that the leading interest is unwilling to take plate contracts at 1.30c and guarantee against decline. Retail prices are somewhat unsettled. Iron bars in car lots are quotable at about 1.35c Pittsburg.

Coke.—The market remains dull with but little doing. A large proportion of the foundries are buying from hand to mouth and this demand does not seem to be sufficient to take the offerings, so that ovens are finding difficulty in making disposition of foundry coke. Furnace coke is inactive with no new contracts pending. The following prices in the leading coke producing districts represent the range between prompt shipment coke and contract. As most of the business is now for prompt shipment foundry coke and for furnace coke to fill in, the inside prices practically represent the market:

	PER TON.
Wise county furnace coke	$1.75 to 1.90
Wise county foundry coke	2.10 to 2.30
Pocahontas furnace coke	1.75 to 2.00
Pocahontas foundry coke	2.00 to 2.25
Standard Connellsvills furnace coke	1.50 to 2.00
Standard Connellsville foundry coke	1.90 to 2.50

Old Material.—The market is dull and easy, and while quotations are not quotably changed, the weakness in the market gives good reason for believing that purchasers could secure concessions from the open schedules. We quote dealers' prices here as follows:

Old No. 1 R. R. wrought, net tons	$13.50 to 14.00
No. 1 machinery, net tons	13.00 to 13.50
Old iron rails, gross tons	16.50 to 17.50
Old steel rails (re-rolling) gross tons	14.50 to 15.50
Old short lengths, gross tons	14.00 to 15.00
Old iron axles, net tons	17.00 to 18.00
Heavy melting scrap, gross tons	13.00 to 13.50
Stove plate, net tons	10.00 to 10.50
Heavy turnings	8.00 to 8.50
Cast borings, net tons	5.00 to 6.00
Car wheels, gross tons	14.50 to 15.00

By virtue of a decision just reached, there will be no limit for the present to the height to which New York's sky-scrapers may be built. The proposed limitation of 350 feet has been killed. Five or six New York buildings now exceed this limit, the Singer tower being 657 feet in height.

One of the stacks of the Buffalo Union Furnace Co. was blown out Feb. 4.

PHILADELPHIA.

Sales of Finished Materials Decreased —Pig Iron Dull.

March 2.

Pig Iron.—The market of the past week in this district has reflected to some extent the unsettled conditions in the steel trade, and because of this uncertainty the aggregate of sales has not been large. There has been and still is a tendency to grant slight concessions here and there, but the interests producing the more desirable grades are still holding at the old figures and a general decline, even small, seems improbable. The week has developed a renewal of interest on the part of a considerable number of large consumers. One of these in particular had covered its probable requirements for the first half, but now finds that its consumption had been under-estimated. None of this inquiry has resulted in business, furnace interests generally not pressing sales, but it appears likely that a very fair buying movement may develop in the near future. There are reports that basic has sagged to as low as $16.00, delivered, but the larger producers refuse to consider less than $16.50 and it seems that the lower price must have reference to off grades. No. 2 foundry is fairly firm at $16.50 to $17.00, delivered, while forge is quoted at $15.00 to $15.50. There is little of the latter to be had, however, either in this district or in the South, and pipe interests are having considerable trouble in covering their requirements of this and low grade foundry irons. There have been no transactions in either low phosphorous or malleable, so far as can be ascertained, and the situation is otherwise unchanged. Victoria furnace at Goshen, Va., has gone into blast. We quote, second quarter delivery at Eastern Pennsylvania plants, as follows:

No. 1X foundry	$17.00 to 17.50
No. 2X foundry	16.50 to 17.00
No. 2 plain	16.00 to 16.50
Standard gray forge	15.00 to 15.50
Basic	16.50 to 17.00
Low phosphorus	21.50 to 21.75
No. 2 Birmingham	17.00 to 17.50
No. 2X Virginia	17.00 to 17.50
No. 2 plain Virginia	16.50 to 17.00

Finished Materials.—Although reports are still rather conflicting, it is pretty well established that the result of the open market declaration so far has been to reduce the volume of orders for finished and semi-finished steel to an insignificant figure as compared even with the bookings immediately before the announcement. One of the largest interests in this section states that its business during the past week was not one-fourth of what it had been, and other concerns are practically out of the market. It develops that most of the Eastern mills are not meeting the prices reported in the Pittsburg district; the schedule for Eastern Pennsylvania delivery which is being generally adhered to by the larger independent interests is a 1.40, Pittsburg, base for shapes and plates and a 1.30, Pittsburg base for bars. Nothing definite in the way of a cut on billets and sheet bars can be learned, rails have not been touched and are not likely to be, tin plate has also been let alone, and light rails were already at such a low figure that no important reductions are looked for there. Even the prices mentioned above apply only on prompt business, and there seems to be a general disposition to avoid booking far ahead. As was to be expected, no railroad business has developed. The Union League structural order has not yet been placed, nor has the Baltimore tobacco warehouse. A number of contractors are figuring on plans for the Curtis building, but bids do not go in until well along toward the close of the month; the project involves about 7,000 tons of steel in its present form. We quote: Structural shapes, 1.50c to 1.60c; plates, 1.50c to 1.60c; steel bars, 1.45; refined bar iron, 1.40c to 1.45c.

Old Materials.—Heavy melting steel has sagged sharply during the week and now gives indications of settling about a $13.50 to $14.00, delivered, level, this being the range at which some small tonnages have been sold during the week. One of the steel plants is giving only $12.00 for overshipments. It is expected, however, that this level will not hold any length of time, and dealers are not inclined to sell at present. Railroads are not offering any tonnages at this figure. We quote, gross tons, Eastern Pennsylvania delivery, as follows:

Old steel rails (re-rolling)	$16.50 to 17.00
No. 1 steel scrap	14.00 to 14.50
Old steel axles	19.00 to 20.00
Old iron axles	21.50 to 22.50
Old iron rails	17.50 to 18.00
Old car wheels	14.50 to 15.00
Choice scrap R. R. No. 1 wrought	16.00 to 16.50
No. 1 yard scrap	14.50 to 15.00
Machinery scrap	14.50 to 15.00
Low phosphorus scrap	18.50 to 19.00
Wrought iron pipe	14.50 to 15.00
No. 1 forge fire scrap	13.00 to 13.50
No. 2 forge fire scrap, ordinary	8.00 to 9.00
Wrought turnings	11.00 to 11.50
Axle turnings, heavy	12.00 to 13.00
Cast borings	9.75 to 10.25
Stove plates	12.00 to 13.00

The Goshen Iron Co., Goshen, Va., applied the torch to its Victoria stack, Feb. 24.

BUFFALO.

Lackawanna Steel Co. Resumes Quoting on Pittsburg Basis.

Office of THE IRON TRADE REVIEW, 932 Ellicott Square, March 2.

Pig Iron.—The past week has shown no material change in the tone of the Buffalo market, which continues quiet at prices as quoted last week. We quote f. o. b. Buffalo as follows:

No. 1X foundry	$16.25 to 16.75
No. 2X foundry	15.75 to 16.25
No. 2 plain	15.25 to 15.75
No. 3	15.00 to 15.50
Malleable Bessemer	16.50 to 17.00
Gray forge	14.75 to 15.25
Charcoal	20.50 to 21.00

Finished Products.—The Lackawanna Steel Co. is the center of interest here at the present time. A week ago, when the break in steel and finished product prices was in the early stages, it was announced that the company had shifted its basing point from Pittsburg to Buffalo. Representatives of other steel interests were concerned over this move, as the difference in freight charges gained by the Lackawanna interests gave them an advantage on some shipments. Today the announcement is made that the Lackawanna Steel Co. is now quoting on Pittsburg base, but further than this the future is not known, and Buffalo interests must draw their own conclusions as to the outlook.

So far as could be learned in this territory, the reduction of steel prices has not materially increased business. Most of the steel interests here report closings of small tonnage, an increase of orders, but not in total tonnage, showing that the general run of business is confined to small orders. It is generally believed that interests in the market for big tonnage are holding back more on account of uncertainties pertaining to tariff revision than for any uneasiness due to present steel prices. One large consumer in Rochester states that business has been notably affected since the disturbances in steel prices, although the interest referred to feels confident that future business will make up for the delay. The smaller class of iron and steel manufacturers report no material change.

ST. LOUIS.

Inquiries for From Six to Eight Thousand Tons of Pig Iron.

March 1.

Pig Iron.—Inquiries for pig iron, estimated at 8,000 tons by some dealers in the St. Louis territory and at 6,000 tons by others, have been re-

ceived, the bulk of which are for shipment over the first half of the year. On this aggregate, 500 tons is for malleable Bessemer. The recent reduction in prices on steel commodities seems to have strengthened the pig iron market, and while some quotations of $12 Birmingham for No. 2 are heard of, it is believed that they are for resale iron, and that $12.50 is really the minimum. This price is made for prompt shipment and delivery over the second quarter. Ohio No. 2 and malleable Bessemer remain strong at $15 f. o. b., the furnace. It is believed that orders aggregating a large tonnage will be placed before the week ends. Our quotations to which the freight of $3.75 from Birmingham has been added, follow:

No. 1 southern	$16.75 to 17.25
No. 2 southern	16.25 to 16.75
No. 3 southern	16.00 to 16.50
No. 4 southern	15.50 to 16.00

Coke.—The coke market practically is unchanged, $2 being quoted by some of the Connellsville ovens for prompt delivery, but the better grades of 72-hour Connellsville foundry cannot be secured for less than $2.10, ovens, and as high as $2.25 has been obtained on contract shipment for the first half of the year and $2.25 to $2.50 for the remainder of 1909. Connellsville 48-hour furnace coke can be had at $1.50 for prompt shipment, and at $1.75 to $2 for delivery over the remainder of 1909. Virginia and West Virginia grades are selling at the prices quoted last week.

Old Material.—The scrap iron market remains at the following quotations:

Cast iron borings, free from foreign material, net tons	$ 6.00
Steel axle turnings, gross tons	12.00
Steel railroad axles, net tons	17.50 to 18.50
Iron railroad axles, net tons	19.00 to 20.00
Miscellaneous steel scrap, gross tons	12.50 to 13.00
Old car wheels, gross tons	16.00
No. 1 railroad cast scrap, net tons	12.00 to 12.50
Heavy machinery cast, net tons	13.00 to 14.00
Stove plate and light cast, net tons	11.50
Sheet iron, net tons, uncut	5.00
No. 1 railroad wrought, net tons	13.00 to 13.50
Railroad malleable, net tons	12.00 to 12.50
Heavy melting steel, net tons	13.00 to 13.50
Relaying rails, net tons	17.00 to 18.00

SEATTLE.

Reduction in Steel Prices Retards Temporarily, but Will Eventually Help.

Office of THE IRON TRADE REVIEW,
302 Pioneer Bldg., Feb. 22.

While the uncertainty in eastern iron circles resulting from the failure to maintain prices, is beginning to have an effect on Pacific coast conditions, and in certain lines buying has almost ceased, the coast is by no means hesitating in its steady march toward better conditions. Reductions in eastern prices would permit the execution of various development schemes in the west at lessened cost, and eventually accelerate instead of retard the volume of business being transacted on the Pacific coast, but just now buyers are holding off, waiting further developments in the price situation, and in the meantime the ability of the western market to consume iron and steel products is increasing daily. All lines are improving quietly and steadily. Building operations are active and the foundries of Seattle are approaching the 1,000-ton mark in their monthly production of building castings. Several shops have increased their capacity 20 per cent in the last two months and are now running at about two-thirds of normal output. The season's shipments of machinery to Alaska will be much heavier than last year; both mining and railway supplies will be active. Over $5,000,000 will be spent on railroad construction north of the Arctic circle during the coming summer. Although the big lead mines in the Coeur d'Alenes are quiet, the purchase of mining machinery for eastern Washington and Idaho delivery is very satisfactory; the Spokane branch of the Hall-Idie Machinery Co. reports sales amounting to about $25,000 during January. Most of this machinery is for small consumers who have new properties to develop.

Pig Iron.—Foundry conditions are good and the pig iron situation is strengthening. Spot iron is still scarce and high, which has put a damper on buying for immediate delivery. About the only spot iron available is English No. 1 that is being reshipped from San Francisco. This iron is held at $27 a gross ton, ex ship Seattle. The foundrymen have confidence in the future and are commencing to make contracts for iron to arrive in July and August. This feature of the situation is very encouraging and it is probable that the July-August cargoes will be well sold out within 60 days. We quote in gross tons ex ship Seattle:

English, Cleveland No. 3 spot	$26.00 to 27.00
Glengarnock, No. 1 spot	28.00 to 29.00
English soft No. 1 to arrive May-June	24.00 to 25.00
English soft No. 1, to arrive July-August	23.00 to 24.00
Southern soft, No. 2	26.70 to 27.20

Old Material.—The increased demand from the foundries has reduced the dealers' stocks of good foundry scrap and the market is stiffening; very little old material of suitable quality for remelting can be obtained for less than $18 per net ton. While the demand is stiffening and the outlook bright, conditions are still easy and deliveries are prompt. We quote in net tons f. o. b. Seattle:

Foundry and machinery scrap	$18.00 to 19.50
Old steel rails	8.00 to 9.50
Railroad wrought	10.00 to 11.00
Country wrought and busheling	5.50 to 8.00

Merchant Iron.—The uncertainties in the east are closely reflected in the merchant iron market of the west and while mill conditions are as yet undisturbed, the sale of rolled iron to consumers has practically ceased while waiting the settlement of price difficulties. The Seattle Steel Co. is operating its rolling mill at 50 per cent capacity and the Oregon mills are running at about the same rate. There have been no cuts yet in bar prices on the coast, but reductions following the decline in the east are expected. These reductions in the domestic products will curtail further foreign importations and should American bars drop as low as $1.80, base per 100 pounds, importations would probably cease. We quote base prices per 100 pounds, f. o. b. Seattle; common iron bars, $2.20; mild steel bars, $2.30; machinery steel, $2.70; Norway iron, $3.50; angles, channels, zees and tees, under 3 inches, $2.75.

BIRMINGHAM, ALA.

Heavy Melting by Cast Iron Pipe Interests.

March 1.

There is not the least improvement in the pig iron market in this section. The quotations continue weak and $12.50 is the high price for No. 2 foundry. The make is still being kept up, but how long this will be continued cannot be stated. There is still some iron leaving this section on old orders and the cast iron pipe manufacturers are melting a large quantity of the product. The pipe people, as has been stated before, have been the most fortunate among all in kindred trade. Their dull period did not continue so long and when the activity did set in, they sold a large quantity of their product. The product is being shipped out promptly. The United States Cast Iron Pipe & Foundry Co. has made another shipment on the Cuba order, a solid train of pipe being started from Bessemer, just south of Birmingham. The Cuba order was of some proportion and considerable is yet to be filled thereon.

The iron men in this section are watching the price changes in steel circles. So far no benefit has struck

this section by reason of the reductions.

The receivers of the Birmingham Coal & Iron Co. were authorized to borrow another $50,000 with which to stop a foreclosure and there is no interruption in the operation of the properties. Legal steps will be taken in the next week or two to bring the Southern Steel Co. (bankrupt), out of the courts in order that the reorganized company can take up the operation of the plants. The filing of a petition for a temporary injunction against the reorganized concern taking charge of the properties and the denial of the same will probably be followed by another move on the part of G. H. Schuler, who headed the company before it went into bankruptcy. The reorganized company is losing no time in preparing for a resumption of operations at the various plants.

The coal and coke trade in Alabama is exceedingly quiet and production is down to the narrowest point.

NEW YORK.

Lowered Prices Have Not Yet Developed Very Much Business.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., March. 2.

Iron Ore.—So far as can be learned, there have been no sales of importance since those last reported. Ocean freights have advanced about two shillings since that time. The Reading system announces plans for extensive improvements to its ore handling facilities at Philadelphia.

Pig Iron.—The market in this district is quiet and softer. Naturally, the confusion in the steel trade has aroused some expectancy that a sympathetic weakening in pig iron might develop, and until this is removed transactions are likely to be limited. Reports of low prices come from the New England district, where one western interest is offering iron quite freely at $17, delivered, for No. 2 foundry. No offerings as low as this are to be discovered in the New York territory or southward, however. A very fair tonnage is under negotiation and may be closed at any time, but it is chiefly for New England shipment and will probably go at a low figure. A meeting of the Eastern Pig Iron Association will be held in this city Wednesday for a general discussion of trade conditions. We quote, second quarter delivery at New York tidewater, as follows:

Northern foundry No. 1	$17.00 to 17.50
No. 2X foundry	16.50 to 17.00
No. 2 plain	16.00 to 16.50
No. 2 southern foundry	16.75 to 17.25
Malleable	17.25 to 17.75
Basic	16.75 to 17.25
Gray forge	15.75 to 16.25

Ferro-Alloys.—There has been no activity in ferro-manganese and the price continues nominal at about $42.50, seaboard. Sales of perhaps 150 tons of 50 per cent ferro-silicon are reported the current price being about $60.50, Pittsburg.

Finished Materials.—The effect of the open market so far has not been to bring out any new structural business of importance. There has been considerable activity during the past week and a fairly good tonnage has been placed, but this has been almost entirely made up of business in contractors' hands at the time the announcement was made; probably the cut has hastened its placing, but eventually it would have come out anyway. It seems that current lettings are almost entirely confined to the east, reports from the central and western sections being that conditions there are more chaotic than in this district. There has been some buying for stock, and more is in prospect.

Bookings of the American Bridge Co. for February came close to 10,000 tons, while probably four times that amount was taken by independent interests. Among the orders not heretofore reported we note the following: Loft building at Irving Place and 16th street, New York, 1,800 tons, to the Hay Foundry & Iron Works; bridges and lock gates for the Erie canal, 2,500 tons to the Pennsylvania Steel Co.; Stuyvesant Apartments, New York City, 1,000 tons, to an independent interest; wool warehouse at Charlestown, Mass., 700 tons, to the Phoenix Iron Works; warehouse in Brooklyn, 300 tons, to Leavering & Garrigues; the Ferry building in Detroit, 1,100 tons, to the Russell Wheel & Foundry Co., and a 300-ton school building at Sandusky to an independent interest.

At San Francisco, Dyer Bros. have the steel contract for the Y. M. C. A. building, 1,700 tons, and an independent interest has the Hall of Records contract at Los Angeles, 3,000 tons. Practically all structural steel jobs in San Francisco bear the names of local contractors, who were importing heavily from Belgium. Structural shapes can be had there at 1c to 1.1c and laid down at San Francisco, duty paid, at 1.70c to 1.80c.

Considerable work is pending in this district. The New York Central is soon to call for some 8,000 tons to complete two sections of its terminals, the Reading Iron Co. is taking figures on 2,000 tons of steel for a new pipe mill and foundry, bids go in March 10 on the Onondaga hotel at Syracuse, 2,500 tons, and several other large projects are pending.

In railroad work the American Bridge Co. has booked 2,400 tons for track elevation of the Pennsylvania system at Chicago; the Chesapeake & Ohio has ordered a 500-ton bridge from the Pennsylvania Steel Co.; the Riter-Conley Mfg. Co. has secured a 400-ton bridge proposition for the Pennsylvania, and the McClintic-Marshall Construction Co. will furnish 3,000 tons for the Atlantic Coast line. A considerable improvement is noted in frog and switch business, but business is light both in standard sections and light rails.

Following the open market declaration there has been considerable selling of billets at $23 at mill plus full freight.

Angles, 3 to 6 inches x ¼-inch and heavier, 1.46c; beams, 3 to 15 inches, 1.46c; tees, 3 x ¼-inch and heavier, 1.51c; plates, carloads, tanks, 1.46c; marine boilers, 1.86c; bar iron, 1.30c to 1.40c; soft steel bars, 1.36c; sheets, No. 28, black, 2.56c.

Cast Iron Pipe.—Newark, N. J., has not yet awarded its 2,000-ton contract, for which the Standard company and R. D. Wood & Co. were the low bidders. The leading interest reports a 300-ton contract at Syracuse; M. J. Drummond & Co., recently secured a 250-ton order at New Brunswick, N. J.; and a fair tonnage is involved in the water works contract at Webster, N. Y. New York City is to open bids on about 4,000 tons March 6 and 8. Prices continue extremely low.

Old Materials.—The market is in a very unsatisfactory condition and trading is so light that quotations are for the most part only nominal. One or two mills in neighboring territory have closed down and the prospect of early improvement is not attractive. We quote as follows, gross tons, New York delivery:

Old steel rails (re-rolling)	$13.50 to 14.50
Relaying rails	21.50 to 22.00
Old car wheels	14.00 to 14.50
Old iron car axles	17.50 to 18.00
Old steel car axles	17.00 to 17.50
Heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	15.00 to 15.50
Iron track scrap	13.00 to 14.00
Wrought pipe	12.00 to 12.50
Cast borings	8.00 to 8.50
Wrought turnings	8.50 to 9.00
Heavy cast scrap	13.50 to 14.00
Railroad malleable	12.50 to 13.00
Stove plate	10.00 to 10.50
Grate bars	10.50 to 11.00

BRITISH IRON MARKET.

Depression Continues, Especially in Finished Materials.

Office of THE IRON TRADE REVIEW, Prince's Chambers, Corporation St., Birmingham, Eng., Feb. 20.

The iron trade continues under a cloud of depression, although, for

various reasons, this has not been felt by the pig iron department to the same extent as finished iron and steel. In the Birmingham district, there has been no giving way in price, but in Middlesbrough prices have shown considerable weakness this week, selling prices descending to 48s 3d ($11.84) and for a day or two even to 48s ($11.78). Today they have recovered to 48s 4½d ($11.87). But stocks are rapidly increasing, today's total being 168,700 tons. The only cheerful sign is that future prices still show some increase upon current transactions, which shows an undertone of belief that the future has better things in store. In the Birmingham district, prices have been very well maintained. There has been no giving away in any direction and makers have in many cases been able to make inroads into their stocks. But there is increasing anxiety among makers of finished iron for specifications. The exports this month have been 38,823 tons as compared with 34,978 last month. In the hematite trade, business is sagging a good deal and it is expected that furnaces on the east coast will be blown out. Makers are securing 56s ($13.70) for mixed numbers, but this is considered inadequate. As Midland smelters are well booked forward, they are entirely averse to making concessions. In the Barrow district, makers are depositing some stocks in their own yards, although the warrant stores are not being increased.

METAL MARKET

ST. LOUIS.

March 1.

Lead and Zinc.—The best base price for zinc blend in the Joplin district last week was $38 a ton. Lead ore was weaker at $50. Joplin zinc ore brought as high a price as $40 a ton on a base of $37.50. One bin was reported sold at this price. In the Oronogo camp one lot of 400 tons is reported to have been sold on a base of $37.50. Numerous smaller lots were sold for $34 and $35 a ton. The surplus is estimated at from 8,000 to 9,000 tons and much of the output is held for a higher base price.

Lead ore slumped to $48 and $49 a ton after the middle of the week, and the demand was not good. The surplus of lead ore is increasing in the district.

St. Louis spelter was quoted at $4.67½ at the close of the week; pig lead at $3.80. New York spelter was quoted at $4.75 and pig lead at $3.97½.

NEW YORK.

Copper.—The market reached a low level on Friday of 12⅝c to 12⅞c for lake copper, but on Monday a decided increase in activity developed and quotations were marked up ⅛c all along the line. There is reason to suspect, however, that this movement was largely speculative, particularly in view of the extremely bad statistical position at present. We quote: Lake, 12¾c to 13c; electrolytic, 12⅜c to 12⅝c.

Pig Tin.—The local situation has hardly followed the improvement abroad owing to the limited volume of business in the domestic market. The position of the metal, however, is strong and dealers are asking 28¾c for spot shipment.

Pig Lead.—The market is weaker than last reported and prices have steadily declined. Current selling is light and is on the level of 3.92½ to 3.97½, New York.

Spelter.—Current business continues so limited and there is so much pressure to sell that the market continues to shade off and spelter is now procurable for New York delivery at 4.70c to 4.75c.

Antimony.—Cooksons, 8⅛c; Hallett's, 8c; ordinary brands, 7⅛c to 7⅝c.

CHICAGO.

March 2.

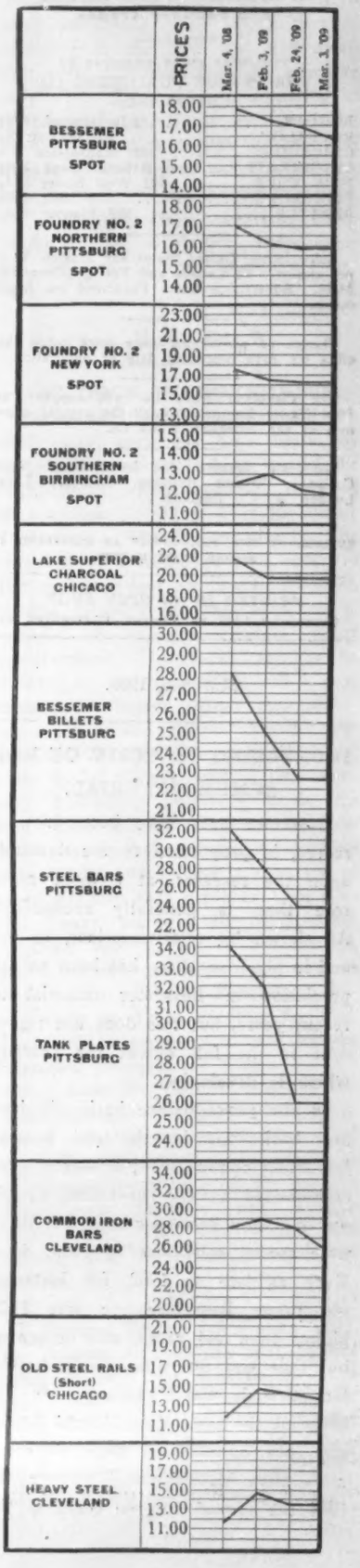
Copper metal, which experienced a slump during the week, has regained considerable strength. A number of large sales have been made in the last few days and inquiries aggregating 50,000 tons are reported. Tin is stronger, but spelter and lead are off slightly. We quote:

Lake copper, carload lots, 13¾c to 14c; castings, carload lots, 13¾c; pig tin, 30½c; spelter, 4.85c to 5c; pig lead desilverized, 4c to 4.10c in 50-ton lots; corroding, 4.65c to 4.70c in 50-ton lots; car lots, 2½c per 100 pounds higher; sheet zinc, 7c list f. o. b. LaSalle in car lots of 600-pound flasks; Cookson's antimony, 10½c to 11c; other grades, 10c.

In the scrap metals copper is a little stronger and lead somewhat weaker. We have revised our prices and quote as follows:

Copper wire, 11½c; heavy copper, 11¼c; light copper, 10½c; heavy red brass, 10½c; heavy yellow brass, 8½c; light brass, 6¼c; No. 1 red brass borings, 8¾c; No. 1 yellow brass borings, 7½c; brass clippings, 8¼c; tea lead, 3c; lead scrap, 3.40c; zinc, 3.25c; tin pipe, 24c; tin foil, 22c; pewter, 17c; electrotype plates, free from dross, 3.75c; electrotype dross, 2.60c; stereotype plates, 4c; stereotype dross, 3.75c; prime slab zinc dross, $45 per ton.

PRICE CHART.



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March 4, 1909.

INCREASING SCARCITY OF BESSEMER MATERIAL.

Bessemer ores have been growing scarce, in proportion to the demands upon the reserves, at a more rapid rate than is generally recognized. As shown by relative prices, in ore and in pig iron, there has been an appreciation in Bessemer material in recent years, but this does not represent to the full extent the scarcity which is developing.

In the years before basic pig iron and basic open-hearth steel became important commodities, Bessemer ores commanded a very substantial premium over non-Bessemer ores, but there were special conditions in those days. Even as late as 1902, for instance, old range Bessemer ore was $1.25 higher than old range non-Bessemer, but that was not due merely to the fact that it was Bessemer ore, because at the same time Mesabi Bessemer ore commanded only 40 cents more than Mesabi non-Bessemer. In 1904 the spread was 40 cents in the case of both Mesabi and old range, representing simply the difference due to the phosphorus content and the higher iron standard of the Bessemer. In 1905 and 1906 the spreads were 55 and 50 cents, an average of 52½ cents. In 1907 came a new relation, the spread being 80 cents in old range and 75 cents in Bessemer, an average of 77½ cents, and the uniform reduction of 50 cents all around in 1908 left those spreads unchanged. Two years ago, then, there was an increase of 25 cents in the spread between Bessemer and non-Bessemer ore.

It is interesting to note how exactly that change in the relative price of the ores was carried out in the pig iron. Below are given annual average prices, f. o. b. valley furnace, of Bessemer and basic pig iron for the past four years. These annual averages are obtained from monthly averages, the monthly averages having been compiled from actual sales, so that the figures are strictly representative of what was done in the pig iron market:

AVERAGE SELLING PRICE, VALLEY.

	Bessemer.	Basic.	Spread.
1905.....	$15.48	$15.17	$0.31
1906.....	18.48	18.27	0.21
1907.....	21.76	20.93	0.83
1908.....	16.14	15.35	0.79

The average spread in pig iron in 1905-6 was 26 cents, while the average spread in ore was 52½ cents. In 1907-8 the average spread in pig iron was 81 cents and in ore 77½ cents. The pig iron spread increased 55 cents and the ore spread 25 cents. The actual spread in pig iron is not equal to the ore spread, on the basis of two tons, or somewhat less, of ore to a ton of pig iron, because the standard Bessemer ore contains more iron and because certain costs in basic pig iron manufacture are higher than with Bessemer.

The enhancement in the past two years, in the market price of Bessemer pig iron as compared with basic, is in quite an exact relation with the higher relative cost of the ore. The ore is destined to become scarcer and to command a still higher relative price. It is increasingly difficult each year for the proper Bessemer mixtures to be found, even by large interests having apparently a good assortment of ore properties.

Another influence is at work which will tend to advance Bessemer pig iron as compared with basic or other grades. It is developing into a specialty. An increasing proportion of the merchant Bessemer pig iron product is going into special uses. The consumption in the iron foundry is increasing, and also the consumption in the acid open-hearth furnace. There are relatively few acid open-hearth steel producers making pig iron themselves; almost the entire consumption is purchased. A steadily decreasing proportion of the merchant output, on the other hand, is bought by Bessemer steel works, as these latter are provided more and more fully with pig iron capacity of their own. Thus from being the standard raw material for the Bessemer steel works merchant Bessemer pig iron has become a commodity put to special uses. For these special uses an iron of predetermined analysis is necessary, because what would be good enough or uniform enough for the Bessemer converter would not be good enough for the uses to which purchased Bessemer iron is now put.

There has been a survival, for a longer time than the rapidly changing commercial conditions have warranted, of the practice of basing contracts upon the average price of Bessemer iron. When the buyer has agitated the idea of basing the contract upon basic rather than upon Bessemer iron, the seller has frequently refused to make the change on the basis of the not very complete reason that basic iron is objectionable because the market is complicated by grades. The Bessemer market is not complicated by grades, and the reason it is not complicated is because, if the expression is permissible, Bessemer iron is too much of a grade. Basic iron is really pretty well established; there are only two kinds, good and bad, and the market can probably be trusted to recognize the distinction, whereupon producers are likely to eliminate the other kind. In other cases a Bessemer basis has appeared advantageous

to the buyer when a liberal spread was offered by the seller, the latter recognizing the distinct trend, but the apparent advantage in such cases is destined to grow less.

GERMAN IRON AND STEEL EXPORTS.

The total iron and steel exports of Germany in the calendar year 1908 are returned at 3,732,428 metric tons, making the year the best the trade has seen. The increase over 1907 was nearly 300,000 tons, while the increase over 1906, the best year prior to 1908, was about 65,000 tons.

The German record in 1908 is quite different from that of England and the United States, as both these countries shows a material decline from 1907, England, indeed, losing over a million tons, while the United States lost over 300,000 tons.

The German export movement in 1908 was quite irregular, showing such swings as from 350,170 tons in September to 288,416 tons in November, and to 315,439 tons in December.

The German trade is largely self contained, like that of the United States. England has large imports, particularly of unfinished steel, and in 1908, while exporting 4,233,956 tons of various classes of material, imported 1,143,389 tons of iron and steel, not including ore, of which total 560,538 tons were ingots, blooms, etc. The German imports last year were only 558,940 tons, the favorable balance therefore being nearly 3,200,000 tons. England, on the other hand, while having larger total exports, showed a favorable balance of a trifle less than 3,100,000 tons, and even that was accomplished by large imports of iron ore.

Compared with such figures, the statistics of the United States look small, but the exports are nearly all clear gain, as the imports are confined chiefly to tin plate, imported for re-export with benefit of the drawback, and pig iron of various grades, chiefly spiegeleisen and ferro-manganese, which we do not make in sufficient quantities at home.

The iron and steel exports of the three great countries in 1907 and 1908 have been as follows:

	1907.	1908.
England	5,311,993	4,233,956
Germany	3,455,899	3,732,428
United States	1,301,979	964,266
Totals	10,069,871	8,930,650

The exports of other countries in 1908 were not sufficient to bring the total to 10,000,000 tons. In the heaviest years, the total might run up to 12,000,00 tons, but, deducting exports the countries made to each other, it is probably safe to estimate that the exports of all the iron producing countries, made to non-producing countries, have never exceeded 10,000,000 tons in a calendar year. This would cover all material from pig iron through all the rolled forms, and include such other material as wire, nails, pipe, castings not actually machinery, etc. Judged by the rate of consumption the United States showed in 1905, 1906 or 1907, the entire demand of the world outside that of the iron producing countries is rather small, and very small in proportion to population.

In connection with the recent report issued by Albert Halstead, the American consul at Birmingham, Eng., and referred to in our Birmingham letter last week, concerning the probability of machines taking the place of hand work in the chain trade in the Black country, an interesting statement has been made by the secretary of the Cradley Heath and District Chain Makers' Association. The secretary said that Swiss machines had been introduced into the district and the German chain had also been received, but he hoped that the workers would be able to hold their own against this competition. The secretary ridiculed the idea that even the machine could compete with the hand labor, because the women are working for 10 pence a day, and some of the men receive less than 12 shillings per week. The low prices paid to women workers have been for many years the subject of protest by social reformers in the Black country, but wages have not been raised, and they furnish a striking example of the competition which American workmen may expect to encounter if tariff protection should be removed.

TO HELP MERCHANT MARINE

Editor THE IRON-TRADE REVIEW:

If there is to be any substantial reduction of our tariff, which I trust there is not, would it not be well to work up strongly the proposition of inserting in the new law a proviso that such reduction shall be effective only when the imports are carried in American bottoms? If this could be brought about, it strikes me that the benefit of the higher tariff which we now have would not be entirely lost, as, with the above proviso, there ought to be substantial inducement for building up our merchant marine.

N. M. LANGDON.

Mancelona, Mich., Feb. 22.

ORE DOCK IMPROVEMENTS.

Plans have been completed and the preliminary work has been begun by the Reading system looking toward the improvement on an extensive scale of its ore dock No. 14 at Port Richmond, Philadelphia. The present pier is to be extended to a length of well over 750 feet and a 45-foot addition to its width is also provided for, this work to be entirely of standard concrete wharf construction. The docks are to be dredged to such a depth as will accommodate the largest vessels now entering the port and also to care for the vessels of even heavier draught which will make use of the proposed 35 foot channel. Unloading machinery to be installed will include a number of electrically-operated Gantry cranes, spanning four tracks and having a capacity of about 300 tons each per hour. An electric power plant is to be installed, switching facilities are to be enlarged, grades reduced, and other improvements made which will give Philadelphia exceptionally good ore handling facilities. These will be necessary to care for the increasing tonnages of Cuban ore resulting from the Spanish-American developments and the increased importations of Continental and Newfoundland ores. The Reading has the advantage of reaching practically all the eastern Pennsylvania furnaces with a low freight rate. The improvements will probably cost in the neighborhood of $500,000.

T. Harbert Taylor, 419 Empire building, Atlanta, Ga., advises that he has about completed the organization of a large railway and mill supply company, which will be located in Atlanta. Further he advises that he wishes to hear from manufacturers of products handled by railway or mill supply houses.

MACHINE TOOL BUILDERS

See No Reason for Changing Prices—Tariff Discussed.

A special meeting of the National Machine Tool Builders' Association was held at the Hotel Imperial, New York City, March 1, with a good representative attendance. The meeting was called chiefly for the purpose of discussion of the pending tariff situation as affecting the machine tool industry and the opportunities of extending its foreign market. After an extended discussion, the following resolution was adopted:

Resolved, That it is the sense of this convention that we favor the creation of a permanent tariff commission for the following purposes:

First—The collecting and intelligent, thorough and unprejudiced study of tariff facts.

Second—The preservation and promotion of our home market and the development and enlargement of our foreign trade.

Third—The accomplishment of this by reciprocal trade agreements, based on maximum and minimum schedules.

Fourth—The adjustment of the tariff schedules so that they shall affect all interests equitably.

Be It Further Resolved, That a copy of this resolution be sent to the Hon. Charles M. Fowler, representative in congress from New Jersey, who is advocating a bill of this nature.

The association listened to an interesting discussion on current conditions in the iron and steel trade by Charles Kirchhoff, editor of the *Iron Age*, and adjourned after adopting the following resolution:

Whereas, There have been certain reported reductions in prices, temporary or otherwise, on certain raw materials entering into the construction of machine tools; and

Whereas, The cost of these materials constitutes only a minor percentage of the total cost of machine tools; and

Whereas, Even should these reductions prove to be permanent, little benefit can accrue to the manufacturer for some time to come; and

Whereas, There has been a marked increase in the total cost of machine tools, due to improved designs, necessity for new equipment to meet the rapid advance in modern shop practice; increased manufacturing and selling burden; and

Whereas, The percentage of margin in the machine tool industry is not adequate nor does it compare favorably with percentages of profit realized in other lines of manufacture; *Therefore Be It*

Resolved, That it is the sense of this meeting that there is nothing in present conditions to warrant a change in machine tool prices, unless such change should be toward a higher level.

A recent report that the tin plate mills of the N. & G. Taylor Co., of Philadelphia, were not in operation, is denied by the firm, which says: "Our open-hearth steel works, furnaces, rolling mills and blackplate plant, foundry, machine shops and copperas plant at Cumberland, Md., as well as our tin plate works at Swanson and Tasker streets, Philadelphia, are, and have been in active operation, with plenty of work ahead for many months; in fact we find ourselves busier and with more work in prospect than at this time last year."

BUFFALO EMPLOYERS' ASSOCIATION SHOWS A MARKED GROWTH.

At the annual meeting and election of officers of the Employers' Association of Buffalo, held recently, the following directors were elected for the ensuing year: Howard D. Barker, of the Frank Machinery Co.; Henry G. Breed Jr., of Gies & Co.; William H. Crosby, the Crosby Co.; J. M. Edsall, the E. R. Thomas Motor Co.; Henry R. Ford, McCarthy Bros. & Ford; R. W. Gardner, Howard Iron Works; C. M. Greiner, Buffalo-Pitts Co.; Lyman P. Hubbell, Fillmore Avenue Foundry & Iron Works, Inc.; Henry Kener Jr., Buffalo Co-Operative Stove Co.; Henry May, the Pierce-Arrow Motor Car Co.; T. L. Richmond, the Buffalo Scale Co.; Alfred J. Russell, Russell & Watson; C. W. Sherman, the Pratt & Letchworth Co.; C. D. Taylor, the Buffalo Storage & Carting Co.; George M. Trefts, Farrar & Trefts. The directors then elected the following officers: President, R. W. Gardner; first vice president, J. M. Edsall; second vice president, Alfred J. Russell; treasurer, George M. Trefts; secretary, John E. Gorss.

It is only a year since the Buffalo Metal Trades and Buffalo Foundrymen's and Boiler Makers' Associations were merged. All branches of industry employing labor are now taken into the association. Satisfactory reports for the year were read by the officers.

Nilson, Miller Co., of Hoboken, N. J., has been incorporated with capital of $25,000, and has located at 1300 Hudson street, in the shop formerly occupied by W. D. Forbes & Co. The company will conduct an engineering and general machine shop business, making a specialty of designing and building, to order, electrical apparatus, gasoline engines, etc., for commercial vehicle, marine and stationary use; also experimental work and special machinery.

The Woodward Iron Co., Woodward, Ala., is planning to add 150 new coke ovens to its plant early next spring.

IN MEMORY OF JOHN H. DAY.

The Cincinnati Metal Trades Association Has Adopted the Following Memorial.

In the midst of life we are in death.

The death of Mr. John Howard Day, president of the J. H. Day Co., brought to a close a useful life and cast a shadow of gloom and sadness over this association and the business life of the city.

A citizen and fellow-member who commanded and enjoyed our confidence and esteem has been taken from us. He was a man of lofty ideals, refined taste and high principles. We shall miss the warmth and cordiality of his greeting, his kindly words and his genial companionship.

In the spirit of loyalty and fidelity to his friends and associates he was always keenly interested in the work of our association and unfailingly zealous of the welfare of all those with whom he came in contact.

He had a wide and varied business experience, and to the work of our association entrusted to him he brought a deep and extensive knowledge of affairs that rendered his service to his associates of the highest value. It was a pleasure to sit in consultation with him, for his keen business perception was always tempered with kindness and consideration.

After years of faithful and arduous labor, the hope of his life was realized, he having lived to reap the fruit of his years of toil and to enjoy the confidence and profound respect of his fellows. His life was crowned with kindly acts that reflect credit on his memory.

He was born July 30, 1850, in Jefferson county, O., and at an early age moved with his parents to Champaign, Ill., where he lived until after his graduation from the University of Illinois. In 1882 he came to Cincinnati and identified himself with The Hunter Sifter Co., becoming secretary of the company. In 1887 he purchased the machinery department of The Hunter Sifter Co., and started in business for himself under the firm name of J. H. Day & Co.

In 1901 The J. H. Day Co. was incorporated, and since that time he has been president of this company.

Our hearts go out to his bereaved ones in their great sorrow, and we hope and trust that the great Master of us all, who tempers the wind to the shorn lamb, will lighten their load of affliction.

Resolved, That as a formal expression of our sympathy this memorial be spread upon the minutes of the association and a copy delivered to the bereaved relatives of our friend and associate, John Howard Day.

F. A. Geier,
Wm. Lodge,
St. P. Egan,
Committee.

Increase in Daily Production of Pig Iron

Our blast furnace returns for February, with the products of a few furnaces whose returns are not in, estimated, show a steady increase in the blast furnace production. The total production in February was 1,681,423 tons, compared to 1,787,473 tons in January. This is a decrease of about 106,000 tons for the month. February containing but 28 days, however, accounts for the drop in total production. The average daily total production of February was 60,051 tons, compared to 57,654 tons in January. Had February had as many days as January, this production would have considerably exceeded that of the latter month, or 1,860,465 tons. The following table shows the production by months during the last two years:

	1909	1908	1907
January	1,787,473	1,043,374	2,194,801
February	1,681,423	1,086,809	2,047,036
March	.....	1,229,856	2,216,709
April	.....	1,155,122	2,226,708
May	.....	1,168,002	2,291,030
June	.....	1,106,300	2,237,420
July	.....	1,228,604	2,253,243
August	.....	1,366,019	2,243,656
September	.....	1,416,252	2,174,148
October	.....	1,573,824	2,359,690
November	.....	1,582,314	1,820,558
December	.....	1,723,664	1,234,733
Total	3,468,896	15,680,140	25,299,732

The production this month is divided as follows: Merchant iron, 612,343 tons; non-merchant iron, 1,057,309 tons; spiegel and ferro, 11,771 tons. The daily production shows an increase of about 4 per cent over January. This is the only basis on which the production of the two months can be compared, owing to their difference in length. The number of stacks in operation in the country is one less, being 233, as against 234 in January. The total average daily capacity in blast on the last day of February is 63,071.8, compared to 59,442.9 tons on the last day of January. The following table shows the average daily production of the various months of last year, compared with those of the present year.

	1909	1908
January	57,654	34,316
February	60,051	37,476
March	.....	39,672
April	.....	38,504
May	.....	37,677
June	.....	36,876
July	.....	39,632
August	.....	44,065
September	.....	47,208
October	.....	50,764
November	.....	52,744
December	.....	55,602

CRUDE STEEL PRICES

Announced at Pittsburg—Contracts for Foundry Coke.

(Special Telegram.)

Pittsburg, March 3.—Semi-finished steel prices have been well established at $23 Pittsburg on billets and $25 Pittsburg on sheet bars, and it is understood that full freight charges to the point of delivery will apply. This compares with the former price of $25 Pittsburg on billets, with an equal division of the freight over $1 and up to $3 and $27 Pittsburg on sheet bars for general delivery at $27.50 delivered to local points of the Pittsburg territory.

Two large foundry coke contracts have just been closed here with prominent western consumers. One is a requirement contract over the extended future calling for from 50,000 to 55,000 tons beginning May 1; the other for about 10,000 tons for delivery over the remainder of the year. The price ranges around $2.25 ovens, indicating that the extended future market for foundry coke is not far from its level.

PACIFIC WIRE PLANT ABSORBED BY CORPORATION.

(Special Telegram.)

San Francisco, March 3.—The American Steel & Wire Co. has taken over the Pacific Steel & Wire Co., with offices in this city and works at Oakland, Cal., and other Pacific coast branches. The product of the company is wire rope and other wire specialties, and its annual capacity is about 10,000 tons.

ENDOWED TRADE SCHOOL.

(Specal Telegram.)

New York, March 3.—By the will of Ervin Saunders, who died Feb. 17, Yonkers is to have an endowed trade school maintained under direction of the board of education. About a half million dollars is provided for this purpose. The school is to be in memory of Mr. Saunders' father, the founder of the machine tool firm of D. Saunders' sons.

LARGE ORDER OF SHAPES.

(Special Telegram.)

St. Louis, March 3.—The American Car & Foundry Co. has ordered 7,000 tons of shapes from the Eastern Steel Co.

No. 2 Haselton stack of the Republic Iron & Steel Co. was blown in Feb. 19. No. 3 stack blew out Feb. 18.

Hamilton stack of the Hanging Rock Iron Co. was lighted Feb. 8.

The Bird Iron Co., Ironton, O., blew out its stack Feb. 5.

FEBRUARY FURNACE REPORT

STATES.	NO. OF STACKS.	NO. IN BLAST ON LAST DAY OF MONTH. FEB.	JAN.	PERCENTAGE OF TOTAL POSSIBLE OUTPUT MADE.	AV. DAILY CAPACITY IN BLAST LAST DAY OF MONTH.	ACTUAL TONNAGE MAKE. MERCHANT.	NON-MERCHANT.	TOTALS. FEB.	JAN.
Pennsylvania	153	94	96	61.9	25,765.0	181,579	536,386	717,965	762,311
Ohio	66	40	39	59.9	12,148.0	126,330	208,647	334,977	364,462
Alabama	46	23	23	50.0	4,832.3	109,510	25,839	135,349	148,404
Virginia	24	12	11	45.2	1,113.6	28,233	———	28,233	30,080
New York	25	14	15	56.5	3,763.3	57,807	49,833	107,640	126,060
New Jersey	9	3	3	33.3	679.8	19,041	———	19,041	21,144
Illinois	25	16	15	64.0	5,425.6	15,008	137,341	152,349	142,506
Tennessee	18	10	11						
West Virginia	4	2	2	49.1	1,890.0	38,036	16,345	54,381	58,037
Kentucky	7	2	2						
Maryland	4	2	2						
Wisconsin	6	3	3	60.0	7,719.2	15,847	82,918	98,765	94,370
Colorado	6	3	3						
Indiana	5	4	4						
Georgia	2	1	1						
Texas	3	0	0						
Minnesota	1	1	1	55.5	735.0	20,952	———	20,952	24,755
Michigan	2	2	2						
Missouri	1	1	1						
Spiegel—All states								4,165	3,272
Ferro—All states								7,606	12,072
Total	407	233	234	57.3	63,071.8	612,343	1,057,309	1,681,423	1,787,473

WAGE REDUCTIONS

Have Been Announced by Lackawanna Steel and Glasgow Iron Cos.

The widespread reductions in the prices of steel material announced about two weeks ago have had the immediate result of bringing about wage reductions of employes both directly and indirectly. Direct wage reductions in two instances were announced Monday. Glasgow Iron Co., Pottstown, Pa., is adjusting its puddling wage rate, which carries with it the usual reductions to rollers, heaters and roughers based, of course, upon the puddling rate. The Lackawanna Steel Co. announced a day wage reduction from 14 cents an hour to 12 cents an hour and the wages of other employes cut, approximately, 10 per cent.

The bi-monthly wage meeting will be held about March 10, when it is expected that the slight reduction of 12½ cents will likely be found based upon the sales of bar iron for the past two months. If the price of bar iron for the ensuing two months drops to 1.25, as now seems likely, the puddling wage would be, of course, $5.12½. But, if, as is not unlikely, the price of bar iron should be found to be 1.20, then, of course, the base rate will be reached for puddling at $5 a ton.

The reduction in the selling price of steel that has already become effective has resulted in a reduction in wages to heaters and to rollers, roughers and other rolling mill employes whose wages are based upon the heater. It will likely require careful scrutiny of the sales sheets for the next two months to determine accurately just what these wage reductions will be.

STOP-OVER PRIVILEGES ALLOWED.

Several of the railroads including the Wabash, Lake Shore & Michigan Southern and other lines have filed new traffic rates with the interstate commerce commission by which they grant stop-over privileges on structural steel and certain other commodities between stated points, at an extra rate of 1¼ cent per 100 pounds. The effect of the new rate on structural steel is to permit plain material shipped originally from the Pittsburg district or some other mill location at a low long-haul rate, to be stopped en route and fabricated at any shop along the line and to then be reshipped, as a finished product to its destination with only the nominal additional charge. The railroads are now accustomed to charge a full rate on the plain steel from the mill to the fabricating shop and a second full rate on the haul of the finished material from the shop to the point of final delivery.

PERSONAL.

Henry R. Towne, president of Yale & Towne Mfg. Co., has been elected president of the Merchants' Association of New York.

S. W. Prince, who has been first vice president of the Chicago Pneumatic Tool Co., has resigned to accept a position with the Kellar Mfg. Co., Philadelphia.

E. W. Pittman, formerly of the Pittsburg Construction Co., has entered the service of the McClintic-Marshall Construction Co., Pittsburg, and is now in charge of the St. Louis office of the latter.

Frank W. Highberger, of Greensburg, Pa., has been appointed sales agent of the Mt. Pleasant Coke Co. with headquarters at Pittsburg. He was formerly connected with the Carnegie Steel Co.

C. E. Stafford, formerly general manager of the Shoenberger Steel Co., Pittsburg, has associated himself with the Prassinos Copper Co. as engineer and general supervisor of the mines and property of the company.

L. G. Nilson, chief engineer of Strang Gas Electric Car Co., of 15 Wall street, New York City, has been elected president of Nilson-Miller Co., 1300 Hudson street, Hoboken, N. J. He will continue as consulting engineer for the Strang company.

George Schuhmann has been elected vice president of the Reading Iron Co., Reading, Pa., with the title of vice president and general manager. J. M. Callen has been appointed assistant general manager, both appointments being effective March 1.

Fred A. Poor has been in charge of the Chicago office of the Rail Joint Co. since March 1. He has been in Europe for the past 20 months in charge of the foreign business of this company and before that time was for several years western representative of the Weber Railway Joint Mfg. Co. For several years prior to that time, he was connected with the engineering department of the Illinois Central railroad.

OBITUARIES.

Dwight B. Kennedy died Feb. 26 at his home in Pittsburg, aged 41 years. He was born in Syracuse, N. Y., was graduated from Cornell University, and in 1890 became connected with the Carnegie Steel Co. as mechanical engineer. Eight years later he entered the employ of Wiliam B. Scaife & Sons, where he remained until his death.

William McCully McKelvy, a pioneer in the manufacture of Portland cement, died at his home in Pittsburg, Feb. 28, aged 59 years. His death was sudden and followed from an illness of only a few hours. Mr. McKelvy originally engaged in the oil business, but saw the possibilities of the Portland cement manufacture and was one of the first to be active in that line of production. At the time of his death he was president of the Alpha Portland Cement Co., Easton, Pa. He was also a director of the Lockhart Iron & Steel Co., Pittsburg, and the Pittsburg Foundry Co.

Thomas Taylor Johnston, well known civil engineer and one of the constructors of the Chicago sanitary canal, died Feb. 22 at his home in Evanston, Ill. In 1886, with City Engineer John Ericsson, Mr. Johnston was appointed engineer for the drainage water supply system in preparation for the plans of the drainage canal, and when actual work began, he was given supervision of the hydraulic engineering features. He built various power plants throughout the west and middle west and south. For the past year he had charge of the preliminary work on the Chicago subway.

Increased Activity.—The South Sharon plant of the Carnegie Steel Co. is becoming active again after an extended shutdown. One of the blast furnaces has been blown in and made its first cast March 1. Six of the open-hearth furnaces and the blooming and combination billet and sheet bar mills are to be started within a week. The plant will be run on billets and sheet bars.

Will Continue.—The receivers of Milliken Bros., Inc., have secured a judicial order directing them to continue the business until April 2. A plan of re-organization has been prepared and is now under consideration.

Receivers' Sale.—The plant of the Passaic Steel Co., Paterson, N. J., is to be sold at receivers' sale, April 9.

The re-organized Sheffield Coal & Iron Co. has leased ore lands on the Anderson estate near Russellville, Ala., the lease to run for 10 years. A washer will be built on the property, and adjoining land owned by the company also opened up.

AMONG MACHINERY MAKERS.

MILWAUKEE.

Renewal of Full-day Schedule Indicates Revival of Business.

March 1.

As an indication that a steady revival of business is taking place, the plant of the Allis-Chalmers Co., at West Allis, has practically returned to a full-day schedule in all departments. Two weeks ago the electrical department, employing 200 men, was running at an eight-hour day schedule, but has now resumed a full ten-hour schedule. It is nearly a month since the airbrake department returned to a full working day, while it is two months ago that the engine department, employing more than 400 men, returned to a full schedule.

The long threatened injunction halting the erection of the Milwaukee municipal light plant, has been filed by Thomas J. Neacy, president of the Filer & Stowell Co. The injunction restrains the city from further issuing bonds or in any way proceeding with the erection of the plant until the courts have acted upon the matter. Mr. Neacy claims that the plant is unnecessary and that there are no funds for its maintenance.

The Geuder & Paeschke Mfg. Co., manufacturer of enameled tin and sheet iron ware, Milwaukee, has changed its name to the Geuder, Paeschke & Frey Co., and increased its capital stock from $150,000 to $1,000,000. Frank J. Frey, who has been secretary of the company for 20 years, will become a member of the firm. Although officials of the company decline to affirm the report, it is reported that the plant will be enlarged and the output increased.

Lang & Scharmann, at Marshfield, Wis., are turning out a 7-horsepower gasoline engine at their foundry and machine shop which is proving successful. During the coming summer, the sales territory of the company will be increased and other sizes of engines will be manufactured.

In honor of the memory of Edwin Reynolds, the Milwaukee and West Allis plants of the Allis-Chalmers Co. were closed during the afternoon of his funeral, Feb. 22. Hundreds of men, prominent in machinery production and engineering, former fellow officials and employes of the old E. P. Allis Co., the Reliance Works, and the present Allis-Chalmers Co., paid tribute to the great engineer. Honorary pall-bearers were officials of the Allis-Chalmers Co., and prominent business men of Milwaukee.

The plant of the Janesville Barb Wire Co., Janesville, Wis., is operating with a full force and with more orders ahead than can be filled at the present time. The company recently moved into new offices and several additions have been made to the plant, which covers an acre in space.

Herman Falk, president of The Falk Co., Henry Harnischfeger of the Pawling & Harnischfeger Co., both of Milwaukee, and Emil A. Wurster, are the incorporators of the American Oxhydric Co., Wauwatosa, Wis. Capital stock of the new concern is given at $100,000.

PITTSBURG.

Reduction of Steel Prices Results in Holding Up Some Orders.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., March 2.

The prevailing price uncertainty in the iron and steel industry has affected the machinery market somewhat in temporarily holding up several projects involving the purchase of equipment until buyers are convinced there is no likelihood of further readjustment. This is regarded as the turn of affairs to be expected under the circumstances, and manufacturers feel that the situation will ultimately express itself in an improved demand for their product.

The Westinghouse Machine Co., East Pittsburg, Pa., records contracts for no less than nine horizontal engines for the past two months. The most recent contract covers two 750-horsepower tandem units for the Iola Portland Cement Co., Iola, Kan. They will be installed in an extension to the large cement mill at Iola. The Iola company has had nearly ten years' experience with gas engines in its cement mills, and the operating equipment comprises 14 engines of vertical and horizontal type, all of Westinghouse construction, some of which have operated for the entire period. The new engines will be direct-connected to the cement mills as in the previous equipment. The Salisbury Steel & Iron Co., Herkimer county, N. Y., is installing a new plant with anthracite producers to operate the mill and the mine shafts in the vicinity. The initial equipment will comprise a 600-horsepower horizontal and a 125-horsepower vertical engine, both driving generators which operate at a frequency of 60 cycles. The power house will be located a few hundred feet from the mill and the shafts about one mile distant. It will also furnish power for compressed air and hoisting service to the mines and for concentrating machinery at the mill. The Portland Cement Co., Portland, Colo., has purchased a 600-kilowatt three-phase, 60-cycle Westinghouse turbo generator equipment, with a Le Blanc condenser, a rotary converter and a switchboard. These are to be installed as an addition to the present plant and serve rather as a gain in economy than in output. This will give an increased power capacity to be used on additional grinding machinery. The turbine and condenser are now being built by the Westinghouse Machine Co., and the electrical apparatus by the Westinghouse Electric & Mfg. Co. The Lyman Mills of Holyoke, Mass., have purchased a 750-kilowatt two-phase, 30-cycle, 40-volt turbo generator set.

The Standard Underground Cable Co. is constructing a new mill at Perth Amboy, N. J., and will install a 750-brake-horsepower horizontal producer gas electric unit to furnish electric power to the new wire mill. Gas will be furnished from a plant of Westinghouse anthracite suction producers yielding gas of about 120 British thermal units per cubic foot. A certain portion of the producer gas will also be used for heating and annealing operations in the wire mill. This engine will be the first of a new size developed at East Pittsburg suitable for direct connection to a 500-kilowatt generator with reasonable overload capacity. The engine and generator will be solid 60 cycles.

The W. J. Rainey coke interests have begun work upon the construction of a new coke plant in the lower Connellsville region to be known as the Allison works. This plant will be located near the Monongahela river and will draw its coal from the same mines which now supply the new Royal plant of that company. The Allison works will consist of 600 ovens of the push type. It is expected to be making coke before the close of the present year.

The Armorite Conduit Co., West Pittsburg, Pa., is making a material

enlargement to the capacity of its works. Seven additional mills for cold rolling steel strips for electric conduit manufacture will be installed. A new process for the passage of rigid conduits through the electro-galvanizing bath is included in the improvement. Three new Westinghouse engines capable of generating 3,000 horsepower are to be added to the power plant of the works.

The Richards Mfg. Co., Bloomsburg, Pa., has secured a contract for the erection of a lighthouse on Miah Mauh shoal, Delaware bay, N. J., and is also building for the Detroit Steel Tube Co. two draw benches which are among the heaviest type ever built.

The Pennsylvania Engineering Works, New Castle, Pa., has built for the La Belle Iron Works, Steubenville, O., a 300-ton metal mixer, a duplicate of those installed at the Gary plant. The same company also built mixers for the New York State Steel Co., and No. 3 for the Tennessee Coal, Iron & Railroad Co.

The Williamsport Wire Rope Co., Williamsport, Pa., reports that the increasing business has justified an increase of 50 per cent in its capacity. All the new machinery will be electrically driven.

The Carbondale Machine Co., Carbondale, Pa., has just installed a gray iron foundry and cast its first heat on Feb. 2. The foundry floor is 50 x 150 feet. The crane service consists of a 10-ton Harrington crane with electric hoists. Jib air hoists will be installed at a later date. The new plant was built under the supervision of L. C. Dodd, of the International Steam Pump Co., Snow plant, Buffalo. This company makes a specialty of refrigerating machinery and special equipment for the extraction of paraffine wax. The foundry melting equipment consists of a Whiting No. 4 cupola, and the company will make its own castings up to six or seven tons, heavier work being done outside.

The Harrisburg Foundry & Machine Co., Harrisburg, Pa., has recently taken the contract for a 900-horsepower cross-compound Corliss engine for the Woodward Iron Co., and one 80-horsepower, one 160-horsepower, and two 240-horsepower engines for the Emigrants Industrial Savings Bank building, New York. Other contracts recently taken were for one 100-horsepower, one 150-horsepower and one 500-horsepower engine for the West Virginia Pulp & Paper Co., Covington, Va., and the equipment for the St. Francis hotel, San Francisco, Cal., for four Corliss valve type engines, two of them being 450 horsepower, one 225 horsepower and one 120 horsepower, to drive Western Electric direct-current generators, and a 500-horsepower cross-compound for the Municipal hospital at Philadelphia to drive direct-current Westinghouse generators and a 250-horsepower engine for the Stonega Coke & Coal Co., Stonega, Va. A 75-horsepower engine was also shipped to the Spanish-American Iron Co., Santiago, Cuba.

The Lycoming Foundry & Machine Co., Williamsport, Pa., has decided to increase the scope of its work by putting in equipment to handle heavier products, and has recently placed an order for new machine tools including planers, lathes and radial boring mill and automatic gear cutter. The company also expects to put in a conveyor in the foundry.

PHILADELPHIA.

Few Large Orders Received—Some Encouraging Features.

March 1.

Although reports from a number of prominent machine tool builders in this district are somewhat conflicting, it is evident that in most lines the improvement noted in January has been moderately well maintained. Except in rolling mill machinery and a few other heavy products, business is reported as fairly good. Occasionally a falling-off is reported as compared with the orders booked in January, but in contrast with the bookings of a year ago, the trade is in decidedly better condition. Few large orders are in sight; the new business is almost entirely composed of orders for one, two or three machines, hence does not reach an extremely large aggregate. The manufacturing industry seems pretty well agreed in the belief that no quick revival of business is to be looked for, though there is evidence that a steady and substantial demand is in prospect.

The Penn Steel Casting & Machine Co., Chester, Pa., has recently turned out a large platen casting weighing about 90,000 pounds, and has orders on hand for two similar castings of somewhat larger size.

The Newton Machine Tool Works, Inc., Philadelphia, reports that during the past month both orders and inquiries have been received in satisfactory volume, largely overcoming the distinct falling off in business experienced about the first of the year.

The Tabor Mfg. Co., Philadelphia, has recently entered orders for a combined jarring and roll-over molding machine for a western steel foundry, similar to the machine just furnished to a large Pennsylvania manufacturer. Orders for standard machines are coming in rather irregularly. As compared with January, the bookings of the month just ended show an appreciable falling off, but with that exception business is better than in any time for 15 months past.

Leading contracting firms are now estimating on the publication house for Cyrus H. K. Curtis at Sixth and Walnut streets, and it is expected that something definite will be decided in this important project in the early future.

The Hilles & Jones Co., Wilmington, Del., is now completing the punching, shearing and bending machinery for the new steel car shops of the Harlan & Hollingsworth Corporation of that city. It reports a very good inquiry for boiler and structural shop machinery. February bookings were about equal to those of January, which in turn were as large as those of any three months in 1908.

A factory building for the General Gas Mantle Co., Fourth and Jefferson streets, Camden, N. J., to cost about $10,000, will be erected by the H. B. Deal Co., Philadelphia. Other important factory building operations in this district include a five-story brick addition to the plant of the Philadelphia Tapestry Mills, to be erected by Wm. Steele & Sons Co., at a cost of about $30,000.

NEW YORK.

Conflicting Reports as to Trade Conditions—One Failure.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., March 2.

The testimony of the various machine tool houses in this district as to the present condition of trade and its tendencies varies to such an extent that no accurate conclusions can be reached, other than the certainty that current business is extremely spotty. A number of interests have found their bookings during the month just ending considerably less than those of January, which, however, was generally one of the busiest months since the depression set in. On the other hand, a few of the larger interests report February as having continued the improvement noted the previous month and, with a larger scattering of orders for single tools

and small lots with now and then a little railroad business, are inclined to be optimistic over the outlook. So far as can be learned, there is little shading of prices in this district, and that is confined almost entirely to the heavy lines.

Some attractive crane business is pending and will probably be awarded in the near future. The crane requirements of the Otis Elevator Co. foundry at Newburgh, N. Y., have been placed; the order divided between the Niles-Bement-Pond Co. and the Shepard Electric Crane & Hoist Co.

During the past week, appraisers have been at work listing the property of the Dwight Slate Machine Co., Hartford, Conn., which went into the hands of a receiver a few days ago. The company manufactured sensitive drills. In this connection, it is interesting to note the almost complete freedom from financial difficulties enjoyed by the machine tool building industry through the long depression.

Industrial cars are still being inquired for in goodly number, but orders continue slow in developing. The demand for cars for export purposes has been an important factor in the trade for some little time.

The board of water supply is advertising for bids on several large sections of the Catskill aqueduct, notably the Wallkill siphon on which bids close March 18, and the Turkey Mountain grade tunnel, on which bids will be received until March 22. J. Waldo Smith, chief engineer, is at 299 Broadway, N. Y.

CINCINNATI.

Little Change in February Demand Brought Some Disappointment.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., March. 2.

But little change in the demand for machine tools is noticeable and the demand during February has been somewhat disappointing. The latter part of the month brought in fewer orders than the opening week, so that as the month drew to a close orders became fewer. The break in steel prices appears to have had a disturbing influence on general business, and while steel, used in the construction of a machine tool, forms an insignificant part of the cost of a machine, still some buyers have been disposed to ask for concessions on prices, based on a lower cost of pig iron and steel. The manufacturers of machine tools have been of course able to meet such arguments but naturally it is an annoying feature in a trade already laboring under difficult conditions. The fact in regard to the cost of machine tools is that the manufacturers probably have less profit in the machines at this time than for many months, when it is considered that the machines must now be produced in shops working with reduced forces and on short time and that instead of running through large lots as 30 or 40 machines, the manufacturer has been compelled instead to run through 15 or 20, thus making the output of the shops per operative so much smaller that the labor cost is increased to a point where there is but little margin and sometimes no profit in the machine. As labor cost is the governing factor in the production of machine tools and manufacturers have been confronted for the past 18 months with the gravest problems as to the best methods to be pursued in operating the plants and holding their organizations together without manufacturing at an actual loss, a demand for price reductions is made at a most inopportune moment.

The Cincinnati branch of the National Metal Trades Association will hold its annual meeting at the Business Men's club, March 11. The meeting will be preceded by the usual dinner. A program of unusual interest has been prepared by the entertainment committee. It is announced that Congressman H. P. Goebel will speak on "Our Merchant Marine and Ocean Mail." Alfred H. Post, of Alfred H. Post & Co., New York, will speak on "Co-operative Freight Traffic." Consul-General Harris, of Smyrna, Turkey, has arranged to address the meeting on "Opportunities for Foreign Trade." H. P. Eels, of the Bucyrus Co. of Milwaukee, vice president of the National Metal Trades Association, and W. A. Layman, of the Wagner Electric Co., of St. Louis, have accepted invitations to be present and speak.

The Cincinnati section of the Associated Foundry Foremen held a meeting at the Grand Hotel, Saturday evening, Feb. 27. Prof. John J. Porter, of the metallurgical department of the University of Cincinnati, addressed the meeting on "The Effect of Composition on the Physical Properties Considered from the Standpoint of Commercial Economy." J. B. Orbison, superintendent of the Ohio Brass & Iron Mfg. Co., Columbus, O., spoke on "The Results of Co-operation in the Foundry."

COURT DEFINES RIGHTS OF MINORITY STOCKHOLDER.

A meeting of the creditors of the Southern Steel Co. is to be held in Birmingham, March 4, at which time it is expected that a decision will be reached to dispose of the property at public sale. If this be done, it is probable that the re-organization will be completed without delay. The application of George H. Shuler, a minority stockholder, for a preliminary injunction to prevent the reorganization committee from carrying out its plans, has been denied by Judge Noyes, of the United States circuit court. In commenting upon this matter, Judge Noyes says:

It is not clear from the plan of reorganization as stated in the papers in what manner it is proposed that the new company shall take over the properties of the bankrupt corporation, the Southern Steel Co. Counsel for the reorganization committee, however, has explicitly stated, and the secretary of the committee has shown, that it is the intention of the committee only to acquire the properties by purchase at a public sale from the trustees in bankruptcy. I think it is my duty, upon this application, to accept these statements as true. In case of such a trustees' sale, therefore, it must be presumed that the bankruptcy court will take the proper steps to secure a fair price for the properties to be sold and to distribute the proceeds of the sale among creditors and stockholders of the bankrupt corporation in accordance with their respective interests. And if the reorganization is only to take place after a judicial sale, it follows that the complainant has not presented a case calling for the issuance of a preliminary injunction. It is admitted that the complainant and all other stockholders have had the privilege of participating in the reorganization upon the same basis. The fact that those who advance new funds will receive far more in new securities than those who advance nothing is only the ordinary incident of a reorganization after a judicial sale. It does not indicate fraud nor that the majority stockholders joining in the reorganiaztion have failed in any duty owed by them to the minority.

But these conclusions only follow in the case of a reorganization after a judicial sale. If the plan were, with the consent of creditors, to take the properties of the corporation out of the bankruptcy court and transfer them to the new company in exchange for its stock by voting the majority shares, the case presented would be essentially different. In the case of the sale by the action of the majority of the entire assets of a corporation a minority stockholder has generally the right to insist that only a monetary consideration shall be received. He cannot be put off with 'chips and whetstones' instead of cash. The complainant should have the right to renew this application in case the committee should not carry out their present intention and should take any steps to consummate a reorganization except as following the purchase of the property of the corporation at public sale in bankruptcy.

The stockholders of the J. A. Fay & Egan Co., Cincinnati, at its recent annual meeting, re-elected the following officers and directors: President, Thomas P. Egan; first vice president, Si P. Egan; second vice president, S. T. Egan; treasurer, A. A. Faber; secretary, W. N. Greene; Joseph Ramsey, Rudolph Kleybolte, John C. Bryce and C. P. Egan, directors. The annual report for 1908 showed that business was improving the latter part of the year as compared with the first part.

OPEN-HEARTH PRODUCTION

Exceeds That of Bessemer by 27 Per Cent.

The American Iron and Steel Association has collected the statistics of the production of open-hearth steel ingots and castings in the United States in 1908 as follows:

Total Production.—The total production of open-hearth steel ingots and direct castings in the United States in 1908 was 7,780,872 gross tons, against 11,549,736 tons in 1907, a decrease of 3,768,864 tons, or over 32.6 per cent. While the open-hearth production in 1908 was considerably smaller than in 1907, it was much larger than the production of Bessemer steel ingots and castings in 1908, the output of open-hearth steel in that year exceeding that of Bessemer steel by 1,664,117 tons, or over 27 per cent. This is the first time that the production of open-hearth steel has exceeded that of Bessemer steel. The maximum production of open-hearth steel was reached in 1907.

The following table gives the production of open-hearth steel ingots and castings by states since 1906 in gross tons. Several thousand tons of nickel-steel ingots and castings are included:

States—	1906.	1907.	1908.
New England....	251,047	239,797	158,417
N. Y. and N. J..	553,186	706,019	350,348
Pennsylvania ...	7,718,213	7,868,353	5,266,372
Ohio	818,683	819,642	525,171
Illinois	884,472	1,013,251	483,104
Other states	754,812	902,674	997,460
Total	10,980,413	11,549,736	7,780,872

The following table gives the production of open-hearth steel ingots and castings in the last 10 years. The production in 1908 was the smallest since 1904:

Years, gross tons.	Ingots and castings.	Years, gross tons.	Ingots and castings.
1899.....	2,947,316	1904.....	5,908,166
1900.....	3,398,135	1905.....	8,971,376
1901.....	4,656,309	1906.....	10,980,413
1902.....	5,687,729	1907.....	11,549,736
1903.....	5,829,911	1908.....	7,780,872

Active and Idle Works.—The open-hearth steel made in 1908, including both ingots and castings, was produced by 125 works in 21 states and the District of Columbia. In 1907 there were 137 works in 20 states and the District of Columbia which made open-hearth steel. During 1909 there were 40 open-hearth steel works which did not make steel, as compared with 25 works in 1907.

Basic and Acid Steel.—In 1908 there were 7,084,568 tons of open-hearth steel made by the basic process and 696,304 tons by the acid process, while in 1907 the production by the basic process amounted to 10,279,315 tons and by the acid process to 1,270,421 tons. This is a loss in production in 1908 as compared with 1907 by the basic process of 3,194,747 tons and by the acid process of 574,117 tons. In 1906 there were made 9,658,760 tons of open hearth steel by the basic and 1,321,653 tons by the acid process.

The following table gives the production by states of both basic and acid open-hearth steel ingots and castings in 1908 in gross tons.

States, gross tons.	Basic open-hearth steel.	Acid open-hearth steel.	Total, gross tons.
New England ..	112,037	46,380	158,417
N. Y. and N. J..	307,738	42,610	350,348
Pennsylvania	4,766,358	500,014	5,266,372
Ohio	477,068	48,103	525,171
Illinois	477,615	5.489	483,104
Other states.....	943,752	53,708	997,460
Total for 1908.	7,084,568	696,304	7,780,872
Total for 1907.	10,279,315	1,270,421	11,549,736

Pennsylvania made over 67.2 per cent of the total production of basic steel ingots and castings in 1908 and over 71.8 per cent of the total production of acid and steel ingots and castings, against over 66.4 per cent of basic and over 82 per cent of acid ingots and castings in 1907. Ohio, Illinois, Alabama, Colorado, and New York in the order named were the next largest producers of open-hearth steel in 1908.

Ingots and Castings.—The production of open-hearth steel ingots in 1908, not including castings, amounted to 7,469,095 tons, against 10,803,211 tons in 1907, a decrease of 3,334,116 tons, or over 30.8 per cent. The production of castings alone in 1908 amounted to 311,777 tons, against 746,525 tons in 1907, a decrease of 434,748 tons, or over 58.2 per cent.

Basic and Acid Ingots.—The following table gives in gross tons the production of basic and acid open-hearth steel ingots in 1908 by states:

States, gross tons.	Basic ingots.	Acid ingots.	Total, gross tons.
New Eng., N. Y., and N. J.....	388,681	66,929	455,610
Pennsylvania 4,735,087	417,570	5,152,657
Ill., Ohio, and other states 1,805,795	55,033	1,860,828
Total for 1908...6,929,563	539,532	7,469.095
Total for 1907...9,912,839	890,372	10,803,211

Basic and Acid Castings.—As already stated the total production of open-hearth steel castings in 1908 amounted to 311,777 tons, as compared with 746,525 tons in 1907. The production in 1907 was the largest in our history. The year of next largest production was 1906. Of the total production in 1908 156,772 tons, or over 50.2 per cent, were made by the acid process and 155,005 tons, or over 49.7 per cent, were made by the basic process. As compared with 1907, when 380,049 tons of castings were made by the acid process, the decrease in 1908 by this process was 223,277 tons. By the basic process the decrease was 211,471 tons, the production by this process in 1907 having amounted to 366,476 tons.

The following table gives the production of open-hearth steel castings by both the basic and acid processes in 1908 by states in gross tons:

States, gross tons.	Basic castings.	Acid castings.	Total gross tons.
New Eng., N. Y., and N. J.	31,094	22,061	53,155
Pennsylvania	31,271	82,444	113,715
Ohio, Ill., and other states	92,640	52,267	144,907
Total for 1908.....	155,005	156,772	311,777
Total for 1907.....	366,476	380,049	746,525

ADDITIONAL CANADIAN PIG IRON STATISTICS.

The *Bulletin* of the American Iron and Steel Association publishes the following:

The production of basic pig iron in Canada in 1908 amounted to 335,410 tons, against 341,257 tons in 1907, and the production of Bessemer pig iron to 112,811 tons, against 154,910 tons in 1907. Basic pig iron was made in 1908 by four companies owning nine furnaces and Bessemer pig iron by two companies owning three furnaces. The basic and Bessemer pig iron was all made with coke. Canada has not made spiegeleisen or ferro-manganese since 1899.

On Dec. 31, 1908, Canada had 16 completed furnaces, of which 10 were in blast and six were idle. One of the idle furnaces was being rebuilt. Of the total 13 usually use coke for fuel and three use charcoal. In addition one coke furnace was projected and two coke furnaces upon which work was suspended some time ago were partly erected.

During the first half of 1908 the total number of furnaces in Canada actually in blast for the whole or part of the period was 14, of which 11 used coke and three used charcoal. During the last half of the year, the total number of active furnaces was 11, of which nine used coke and two used charcoal.

The National Adding Machine Co., 1354-1384 West Seventh street, Cleveland, advises respecting its recent increase of capital stock that it does not expect, this spring, to enlarge its plant, which is now fully equipped, but will extend its business by establishing selling agencies in the principal cities. It may be necessary to build additions to the present plant in the fall, which it can do on the ground now owned by it.

FEATURES OF PACIFIC COAST PIG IRON MARKET.

Probably very few people in the United States, even among those directly engaged in the iron business, know that nearly three-fourths of the pig iron melted on the Pacific coast is imported from foreign sources and is not American iron at all. This fact, coupled with the extreme distance between the purchaser and the furnace, and the large area over which a relatively small tonnage is distributed, creates peculiar conditions in the Pacific coast iron market not found anywhere else in the United States, and probably nowhere else in the world.

The estimated annual consumption of foundry iron on the Pacific coast is as follows: British Columbia, 7,000 tons; Washington, 18,000 tons; Oregon, 16,000 tons; California, 70,000 tons; total 111,000 tons. Of this amount about 80,000 tons is imported. Most of the domestic iron comes from Alabama and is consumed in California and eastern Washington; but very little is melted west of the Cascade mountains in Washington, Oregon and British Columbia.

The imported iron comes chiefly from four countries: China, Scotland, Germany and England.

The Chinese iron is manufactured from native ores at the Hanyang Iron & Steel Works, China. This plant is operated by the Imperial Chinese government and aside from some iron sold in Japan, that which comes to the Pacific coast is believed to be all that is exported. Only the No. 1 grade is shipped to the Pacific coast. Its analysis is as follows: Silicon, 2.5 to 3.0 per cent; manganese, 0.5 to 1.0 per cent; phosphorus, 0.1 to 0.0 per cent; sulphur, 0.02 to 0.04 per cent; carbon, 3.2 to 3.5 per cent. This corresponds very well with the usual analyses of No. 1 American foundry iron.

Scotch iron is imported in limited quantities and has been used mostly on government contracts and for special work; some Scotch pig has also been purchased by the Pacific coast navy yards. Only the best grade of Glengarnock gray foundry is imported and its price on the Pacific coast is seldom less than $28 a gross ton. The average price is about $32.

German iron is imported intermittently; occasional ships clearing from German ports have brought it to the Pacific coast.

Fully 80 per cent of the imported iron comes from England, the Cleveland furnaces furnishing the greater tonnage. Cleveland No. 1 is a favorite grade. In a recent inquiry, out of 13 foundries eight specified Cleveland No. 1 or its equivalent. The iron is sold almost entirely by fracture. The Pacific coast foundries wish an iron that will carry as large a burden of scrap as possible, because the price of scrap is only 75 per cent of the price of No. 1 pig and the pig is so costly that every reasonable expedient that will reduce the cost of melted iron is adopted. For this reason it is extremely difficult to sell iron below No. 1 grade on the Pacific coast.

A group of resident pig iron brokers located at Seattle, Portland, Ore., and San Francisco and the Pacific coast representatives of various large English shipping and importing firms form the two main agencies in the handling and distribution of the pig iron on the Pacific coast. Most of the iron is handled by the regular brokers. The importing firms enter the market spasmodically and during times of stress like the past year handle practically no pig iron whatever. At the best they are a disturbing factor in the trade. The sale of pig iron is only an incident to their main business of shipping grain and lumber and they do not always aim to make a profit on their iron transactions. The principal brokers of pig iron are the United Steel & Equipment Co., Seattle; E. P. Jamison & Co., Seattle; Chas. F. Beebe, Portland, and Henry Lund & Co., San Francisco. The principal importers who deal occasionally in pig iron are Balfour, Guthrie & Co., Kerr, Gifford & Co. of London and the Dollar Steamship Co. of San Francisco.

The distance between the English furnaces and the Pacific coast foundries is roughly 15,000 miles. This distance is so great that it would be uneconomical to ship iron were it not for certain special conditions which produce low freight rates.

Every fall there are a large number of cargoes of grain shipped from Puget Sound and the Columbia river to Europe. The grain ships arrive for loading any time between February and October and the grain is all dispatched between September and January. Throughout the entire year, there are cargoes of lumber being shipped to Australia and to Europe. This slow freight is carried almost exclusively in sailing ships. All this cargo, both grain and lumber, is outward bound and the ships have to return from Europe empty, ballasted with sand or pig iron. For this reason, since the ships must come to the Pacific coast anyhow to get their cargoes, they prefer to carry pig iron at a low rate than to carry sand for nothing besides paying the expense of its loading and unloading. The rate on pig iron is from $3.50 to $7.00 a ton; the shipowners charge whatever they can get.

This creates peculiar conditions in the Pacific coast iron market. Often there will be two ships on the way, one carrying iron at say $4.00 and the other at $6.00 a ton. Obviously, if the broker sells all the iron based on the $4.00 rate, he will lose money, or if he sells it all based on the higher rate, he may have difficulty in disposing of it. The actual value of the iron in both cases is the same. Each cargo is therefore treated as a unit and a price fixed. The broker will try to first sell out the higher priced cargo and will then offer the lower one. In case the lower freight rate was obtained by a competitor, he will have to meet the lower price and lose money on this shipment. Or market conditions may be poor, forcing a low price. It is often a rather uncertain venture for the broker.

As soon as the ship leaves England, the broker begins to sell the iron "to arrive" by a certain date. Inasmuch as the ship may be from four to seven months on the way, depending on the weather, the date of delivery is very uncertain and the early buyers are compensated for this by a reduced price. As the ship progresses and is reported now and then, the date of delivery becomes more certain and the price of iron is raised accordingly. When the ship arrives, the iron is sold at the spot price. Thus on a recent cargo, some of the iron was sold at $22.50 just after the ship left England; a couple of months later it was $24.00 and on arrival was $27.00. This offers quite an inducement to the foundryman to buy for extended future deliveries.

Market prices are very mixed and uncertain on the coast. The price for future delivery is dependent entirely on the cost at the furnace and the freight rate obtained for the particular shipment question.

Spot prices depend on the visible supply and the demand. Often weather conditions will be such that three ships leaving England a month apart

will arrive all at once. This gluts the market with iron and depresses the spot price. Again, as was recently the case, the expected cargoes do not arrive, stocks become very low, the demand increases and the spot price soars.

In the east a foundryman can contract for the delivery of a certain number of tons a month at the market price. In the west this is impossible. He may buy, for future delivery, iron on a certain ship for a stipulated price. This may arrive when he wants it or it may come 60 days before or after it is needed. Occasionally the ship sinks and the iron never arrives. If he does not buy in this way and take chances on the delivery, he has to pay at least $1.50 more per ton for spot iron and run the risk of the price being much higher. To buy economically under these conditions requires unusual foresight. At the best, the element of chance is large.

At coast points, the overland freight rates are such that domestic iron is rarely less than $1.00 a ton higher than the foreign brands. Usually the difference is greater.

CUSTOMS DECISION.

A. Leschen & Sons Rope Co., St. Louis, entered round steel wire at a value over 4 cents per pound, whereas, the market value as reported by the United States appraiser for the same was under 4 cents per pound. The wire paragraph of the tariff provides that certain wire valued at over 4 cents per pound shall pay duty at 40 per cent. Wire valued at 3⅞ cents per pound, for example, would pay duty at 52 per cent. The law is that duty shall not be taken in any case at a lower value than the entered value. Consequently on the record before it, the board of United States general appraisers sustained the protest of the importers.

The Chase Foundry & Mfg. Co., Columbus, O., at the annual meeting, chose these officers: President, T. A. Myers, of Ashland; vice president, Guy C. Myers; general manager and secretary, S. M. Chase; superintendent, W. C. Stocklin. Reports showed that during the dull period of the past year the company's facilities were largely increased, and much special machinery installed. It is giving special attention to the requirements of brick, stone and concrete equipment.

The stockholders of the New Jersey Zinc Co. have re-elected the retiring directors.

NOVA SCOTIA STEEL.

Report Shows Slightly Decreased Profits—Plan to Secure New Capital.

Toronto, Canada, Feb. 25.—At a meeting of the directors of the Nova Scotia Steel & Coal Co. at Montreal on Feb. 19, a statement of the year's business for 1908 was presented, showing profits amounting to $734,701, as compared with $944,790 for 1907. The total shipments of steel were 44,421 tons, as against 50,053 tons for 1907. The coal output was a record one amounting to 718,654 tons. The balance carried forward to the credit of profit and loss account was $1,219,221. The sum expended on capital account during the year was $321,735. It was announced that no dividends would be paid on the common stock. In order to provide funds for liquidating the present indebtedness, and for the equipment of the submarine iron ore areas of the company at Wabana, Newfoundland, it was found necessary to secure additional capital, and it was thought best to withhold the dividend until the financial arrangements of the company had been completed.

The plan for the re-organization of the company's finances referred to is embodied in a bill introduced in the Nova Scotia legislature this week empowering the company to redeem existing bonds amounting to $3,561,500, and to cancel preferred stock to the amount of $1,030,000 by paying for same not exceeding $120 per share, securing the amount needed for this purpose and the additional capital required by a new issue of bonds and debenture stock giving a mortgage on all or part of their property to the Eastern Trust Co. This legislation is to be ratified by the shareholders.

Manager Franz of the Lake Superior Corporation has issued a statement that the company will immediately begin extensive additions to the open hearth furnaces at the Algoma steel plant, Sault Ste Marie. Other improvements will follow, among which, it is stated, are new blast furnaces and a structural steel plant. T. J. Drummond, of Montreal, vice-president of the Lake Superior Corporation, states that the reductions made in the price of steel by the United States Steel Corporation will have no effect so far as the output of the steel plant is concerned, and that its prices will not be changed.

The Hydro-Electric Power Commission of Ontario, charged with carrying into effect the plans of the provincial government for the distribution of power from Niagara Falls to Western Ontario municipalities, this week accepted tenders calling for the expenditure of $750,000 for the electrical equipment of distributing and transformer stations. The Canadian General Electric Co. of Toronto and Peterborough, Ont., gets about two-thirds of the amount, and the Canadian Westinghouse Co. of Hamilton, Ont., one-third. The cost would have been less but for the decision of the commission to adopt a protective system for the avoidance of accidents from broken wires charged with electricity. By this system as soon as any one of the transmission wires breaks, the current is cut off at the other end and the wire becomes dead.

Reopening Old Mines.—The statement is made that the Lanesboro iron mines, at Pittsfield, Mass., are to be re-opened, and that a railroad will be built to facilitate shipments from the mines. The mines have been closed more than 20 years, having been formerly operated by the late John Colby, who sold the property to an English syndicate. The property is now owned by Gilbert West. Several years ago, Samuel J. Colt secured control of the Cheshire mines, which had not been operating for a great many years, and after restoring them to workable condition he found a market for the ore. Several months ago, announcement was made that Mr. Colt had associated himself with R. A. Burget and William Hall, in the Richmond Iron Co., and that they had taken over the operation of both the Cheshire and Richmond plants. It is reported that they have also taken over the Lanesboro properties.

A rail rolled by the Pennsylvania Steel Co., in 1876, for the Cumberland Valley Railroad Co., was discovered the other day by James P. Gaffney, who was inspecting a lot of old rails sold by the railroad to a southern lumber company. The rail had been in service on the main line for 36 years and is still in serviceable condition. The date of manufacture is plainly stamped on the rail.—Steelton (Pa.) *Reporter.*

It is planned to begin operating the new sheet mill at Mansfield, O., built by W. M. Blecker, of Canton, some time this week.

IN STRONG POSITION.

The Sheffield Coal & Iron Co. has Been Reorganized.

With the exception of some legal details yet to be disposed of, the reorganization of the Sheffield Coal & Iron Co. is now complete. On Feb. 24 the Sheffield Coal & Iron Co., of New York, was incorporated with an authorized capital of $750,000 of preferred stock and $2,500,000 common stock. This company is organized for the purpose of taking over the properties owned by the old company, which was a New Jersey corporation and the assets of which will be turned over to the new company in the near future.

Officers of the new company are: President, E. G. Rust, until recently associated with the Illinois Steel Co., but for some months in charge of the Sheffield properties; vice president, James Gayley; secretary, W. S. Reed, for a considerable time associated with Mr. Gayley; treasurer, P. H. White; directors, E. C. Converse, James Gayley and W. R. Walker, New York; Randal Morgan and C. W. Funk, Philadelphia; William Edenborn, New Orleans; Alfred Clifford, St. Louis, and E. G. Rust, Sheffield, Ala. The company will start with a cash capital of approximately $500,000, and it is contemplated that bonds will be issued on the property to the extent of $750,000. The company's furnaces are not now in blast and probably will not operate until the iron trade is in stronger position. The coal mines and coke ovens, however, are now operating.

LOCATES IN ATLANTA.

The Dixie Culvert Metal Co., Middletown, O., advises that it expects to locate in Atlanta, Ga., covering the southern states from South Carolina and Florida to Arkansas. In addition to manufacturing metal culverts, it will handle a line of black and galvanized sheets and the various building material products of the American Rolling Mill Co., of Middletown. Details of building and equipment will be announced later.

Wisconsin Engineers Organize.—Engineers from all over the state gathered at the University of Wisconsin, at Madison, last week, for the first meeting and formal organization of the Wisconsin Society of Engineers. During a two days' session, the engineers inspected various features of engineering interest at the university and in the capital city and listened to addresses by President Charles R. Van Hise of the University of Wisconsin, State Forester E. M. Griffith, W. D. Spence of the state railroad commission, Dean F. E. Turneaure, of the college of engineering of the university, and others.

TO MAKE METALLIC PACKING.

The California Metallic Packing Co., Sacramento, Cal., which was recently incorporated, has these officers: President, Rufus Make; vice president, Harry E. Kilbourn; treasurer, John F. Fenton; secretary, George R. Tuttle. The company is manufacturing and selling the brands of packing known as the K. & M. and K. & Y. improved metallic packing. The packing has been thoroughly and completely tried on the locomotives of the Southern Pacific railroad for years past. The company is installing its manufacturing plant, its officers being practical men.

CONSTRUCTS NEW SHOPS.

The officers and entire board of the Shattuck-George Iron Co., Wichita, Kans., were recently re-elected as follows: President and general manager, F. W. George; vice president, John Massey; secretary, S. W. Shattuck Jr.; treasurer, W. B. George; S. W. Shattuck Sr., Sedgewick, Kans., and J. F. Yungmeyer, of Wichita, Kans. The company will shortly begin the construction of a factory building on Rock Island avenue, having outgrown its present quarters.

The Ironton Engine Co., Ironton, O., recently closed a contract with the Jacobson Gas Engine Co., of Chester, Pa., to supply the Chester company with all of its gas engines ranging in size from 200 to 3,000 horsepower. The Ironton company has also contracted with Levi D. York, of the York Portland Cement Co., for the manufacture of a number of large pulverizing machines of Mr. York's invention.

The Brown Hoisting Machinery Co., Cleveland, re-elected these officers and directors at the recent annual meeting: President, Fayette Brown; vice president and general manager, Alexander E. Brown; secretary, George C. Wing; treasurer, Harvey H. Brown; assistant treasurer, C. F. Pratt; C. C. Bolton, H. D. Coffinberry, R. A. Harman, R. W. Hickox, T. P. Howell and James Virdin.

CAST IRON PIPE

In Large Quantities Will be Purchased by City of San Francisco.

San Francisco, Feb. 23.—The Board of Public Works of San Francisco has given out the specifications for the 45,000 tons of cast iron pipe to be used in the construction of the auxiliary fire system. Bidders are asked to submit three sets of figures, stating the price per ton loaded on cars of a transcontinental road or one of its feeders; the price delivered on dock within reach of the tackle of an ocean-going vessel, and the price delivered in San Francisco on cars, but not unloaded.

On the first two bids the city will pay the freight, on the third the manufacturers must pay the expense. The first consignment must be shipped 30 days after the award has been made, and must average 50 tons a day for the first and second months, 150 tons a day for the third and fourth months and thereafter 200 tons a day.

The shipments must be completed within 330 days from the date of the award. If the shipments are to be made by water, they must be delivered at New York, Philadelphia, Charleston, New Orleans, Mobile, Baltimore, Nashville, Savannah or Galveston. This wide range gives bidders in many sections on the Atlantic seaboard an equal chance to compete.

The bids will be opened in public at 3 o'clock on Monday afternoon, March 10. As a token of good faith the Board of Works requires a prospective bidder to deposit $10 upon receiving a copy of the specifications, the deposit to be returned after the bids have been opened.

According to the estimate submitted by the city engineer, the city will expend $3,140,000 for the construction of the auxiliary fire protection system from February until July of the current year. Of that amount $1,400,000 is for pipe, and the balance will be spent for cisterns, hydrants, gate valves, reservoir and pumping station.

This may look like a big job, but it appears small compared with what San Francisco will have to do before it will have the water system its people are fighting for now, and must have it as soon as possible, no matter what the cost is.

PITTSBURG CONDITIONS.

An Investigation of the Homes of the Toiling Masses.

The Pittsburg Survey, conducted under the patronage of the Russell Sage Foundation, is publishing the results of its investigations in *Charities and the Commons*, a journal of constructive philanthropy, published in New York. The investigations cover three features: First, the people; second, the place; and third, the work. The investigations, which have been conducted by a force of trained men and women, were begun in September, 1907, when the investigators—all of established reputation as students of social and industrial problems—spent a month in Pittsburg. On the basis of their diagnosis, a series of specialized investigations was projected along a few lines, which promised significant results. Important assistance was rendered by representatives of the different races making up a large share of the working population. Concerning the people, the inquirers have dealt with the wage earners of Pittsburg in their relation to the community as a whole, and also in their relation to industry. The investigators studied the genesis and racial make-up of the population, its physical setting and its social institutions; the general labor situation; hours, wages and labor control in the steel industry; child labor, industrial education, women in industry, the cost of living, and industrial accidents. The published reports cover the first two divisions of the investigations—that is, the people and the place—under such headings as the following, which will give an idea of the subjects treated:

Pittsburg—An Interpretation of its Growth; The New Pittsburgers, Slavs and Kindred Immigrants in Pittsburg; Some Pittsburg Steel Workers; The Temper of the Workers Under Trial; Working Women of Pittsburg; The Slav's a Man for All That; The Negroes of Pittsburg; The Jewish Immigrants of Two Pittsburg Blocks; Homestead—A Steel Town and Its People; A City Coming to Itself; Civic Improvement Possibilities of Pittsburg; Effects of Forests on Economic Conditions in the Pittsburg District; The Transit Situation in Pittsburg; Aldermen and Their Courts; Charities of Pittsburg; The Housing Situation; Painters' Row; The United States Steel Corporation as a Pittsburg Landlord; The Milltown Courts and Their Lodgers; Thirty-five Years of Typhoid, Showing the Fever's Economic Cost to Pittsburg and the Long Fight for Pure Water; Pittsburg's Foregone Asset—The Public Health.

The article on the Milltown Courts and Their Lodgers is by Margaret Byington, former district agent of the Boston Associated Charities, and presents a most impressive picture of conditions unfavorable to health and morality in Homestead. In 21 courts of one ward of the city, Miss Byington found 239 families, 102 of whom took lodgers. Even of those who live in two room tenements, one-half took lodgers; 51 families, including sometimes four or five people, lived in one-room tenements. One-half the families use their kitchens as sleeping rooms. Only three houses had running water inside, and in at least three instances over 110 people were dependent on one yard hydrant for water. Fifty-eight per cent of the houses have only four rooms, and only four have more than six. Accumulations of rubbish and broken brick pavements rendered the courts untidy and unwholesome. The greatest evils to the dwellers arise from inadequate water supply, meager toilet facilities and over-crowding. It is probably true that similar conditions prevail in many other industrial centers.

All of the reports are well written and bear the impress of careful and conscientious work. Already some reforms have been inaugurated as a result of the disclosures made, and an immense amount of good will, let us hope, be accomplished. The reports on the last section of the investigations—that relating to the work—will soon be published.

BUILDERS ORGANIZE.

The first annual meeting of the Builders' Association of Michigan was held at Grand Rapids recently. The association organized by the election of the following officers: President, Edwin Owen, Grand Rapids, Mich.; first vice president, John M. Feiner, Ann Arbor; second vice president, J. P. Miller, Bay City; third vice president, Moore McQuigg, Kalamazoo; secretary, John J. Whirl; treasurer, A. A. Albrecht, Detroit. Harry E. Hoskin, Grand Rapids, and A. J. Bees, Saginaw, were appointed delegates-at-large by the executive board. The Builders' Association of Detroit assisted materially in the organization, and the Grand Rapids builders, who splendidly entertained the association, greatly aided in making the meeting a success.

NEW OFFICIALS FOR PHILLIPS SHEET & TIN PLATE CO.

When Howard M. Davis, Philadelphia sales manager for the American Sheet & Tin Plate Co., severed his relations with that concern in January, he immediately organized a company for the purpose of building an independent tin plate mill. He went to Pittsburg with the intention of letting contracts for buildings and machinery, but before actually closing any of the contracts a consolidation of the Phillips company and Mr. Davis' organization was effected, thus eliminating an additional independent concern. The proposition met with favor by all parties interested and the capital and forces of the two companies were amalgamated, thus making of the Phillips Sheet & Tin Plate Co. a very strong concern. By the terms of consolidation, all of the old officers resigned and new ones were elected as follows: E. W. Mudge, chairman board of directors; E. T. Weir, president; Howard M. Davis, vice president and general manager of sales; Wm. H. Baldridge, vice president; D. M. Weir, secretary.

E. T. Weir was for many years connected with the American Sheet & Tin Plate Co. in the capacity of mill manager, but for the past four years, while holding the office of secretary of the Phillips Sheet & Tin Plate Co., has really been the active head of it, and will continue as such in the larger company. Mr. Davis has been a tin plate salesman for about 15 years and is personally acquainted with nearly every buyer of tin plate in the country.

The Hoskins Mfg. Co., formerly the Hoskins Co., of Chicago, has started its new plant and opened a general office at 453-471 Lawton avenue, Detroit. The company has located there an extensive factory, with new equipment and enlarged facilities for making and distributing its established line of electric furnace pyrometers and heating appliances. While the re-organization has been effected and the capital increased to $500,000, the management is unchanged, the officers of the company beeing: President, Hoyt Post; vice president and sales manager, W. W. Talman; general manager and treasurer, E. F. Hoskins; and secretary, Jonathan Palmer Jr. A. L. Marsh will continue in the capacity of electrical engineer for the company.

MACHINE TOOL SALESROOMS IN NEW YORK

Probably nowhere in the country is the showroom employed to greater advantage as an aid in the selling of machine tools than in New York city. This is in keeping with the position of foremost importance occupied by the city as a machinery selling center. The reasons for this commanding position are several and obvious. In the first place, the city has within its limits and those of its suburbs a surprisingly large number of various metal working establishments, large and small, but all purchasers of equipment in greater or less degree. Looking out a little further, it is the natural center of an extensive and prosperous manufacturing district stretching along the seaboard both to the south and New Englandward and back to the mountains. Its leadership as a shipping center naturally gives it a predominating place in the export trade, in which the item of machine tools is a large and growing factor. Furthermore, its multitudinous business interests are every day requiring the presence within its borders of thousands of men prominent in all lines of manufacturing in all sections of the country and through these occasional visits an important volume of scattered buying throughout the interior is maintained. But of perhaps greatest importance is the fact that in New York city are centered the administrative offices of a very large proportion of the larger industrial enterprises, and that from these offices the bulk of the purchasing is done for plants located here and there about the country.

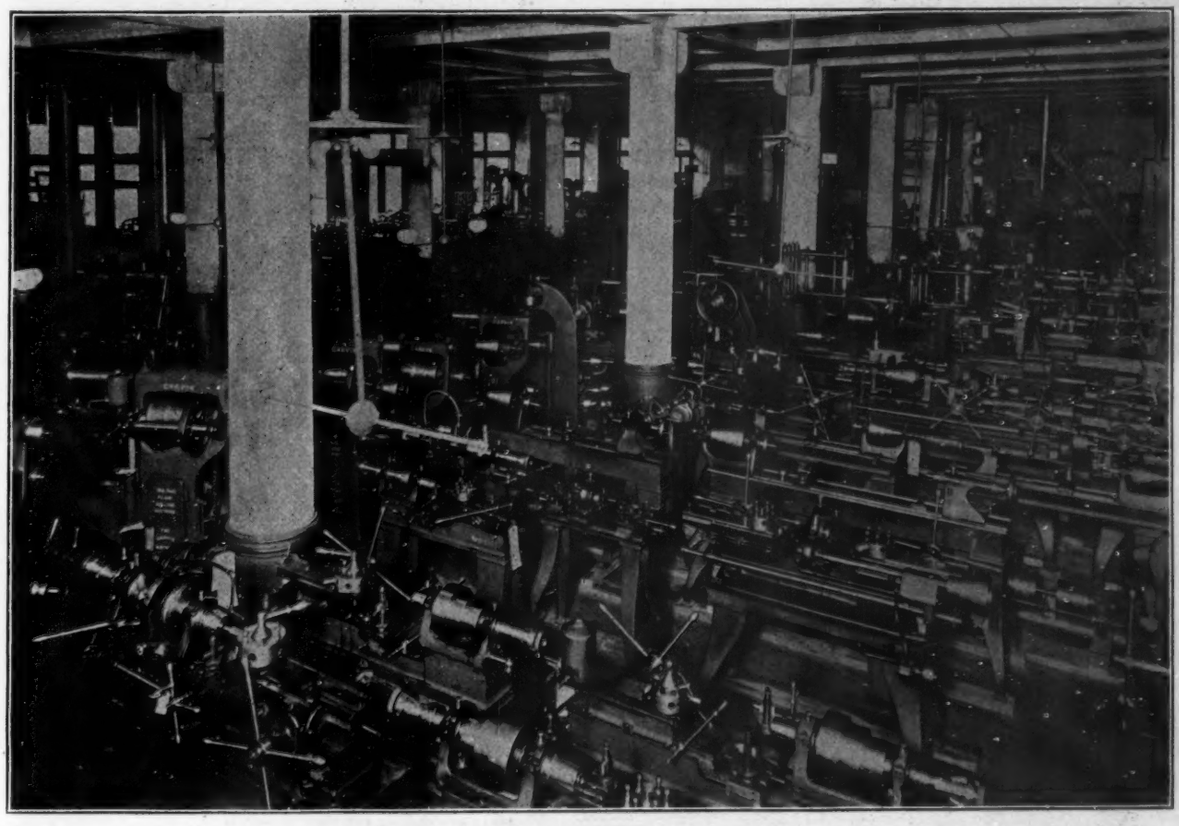


FIG. 1—SHOW ROOM OF GARVIN MACHINE CO., OCCUPYING GROUND FLOOR OF FACTORY BUILDING.

With these elements in its favor, it has been only natural for New York city to make the most of its opportunities, and it now boasts a number of large and well-arranged showrooms which compare favorably with the best facilities afforded by other principal cities for the exhibition and sale of machine tools. The development of this method of selling has been a matter of the comparatively recent past and has been made necessary by the demand of the purchaser for every possible assistance in filling his requirements.

"Twenty years ago," said the manager of one of the largest selling agencies in New York, "the situation was entirely reversed. At that time I was employed in a machine tool manufacturing plant and the ordinary practice was for the prospective purchaser to visit our plant, together with those of other manufacturers in our line who were sufficiently well located.

"Under this arrangement, opportunities were afforded, of course, for a careful investigation into the way the machine was built, the materials used, and the care and class of workmanship employed in its construction, so that the buyer could tell exactly what he was securing. The great difficulty was that this plan involved considerable travel, for if the purchaser had any considerable list of tools to buy and went carefully into each, he had an enormous task on hand."

Nowadays the manufacturer with a list of tools to purchase comes to one of the machine tool centers, where he finds the important factors in the trade closely grouped. In a showroom such as is maintained by the largest selling interests he can see

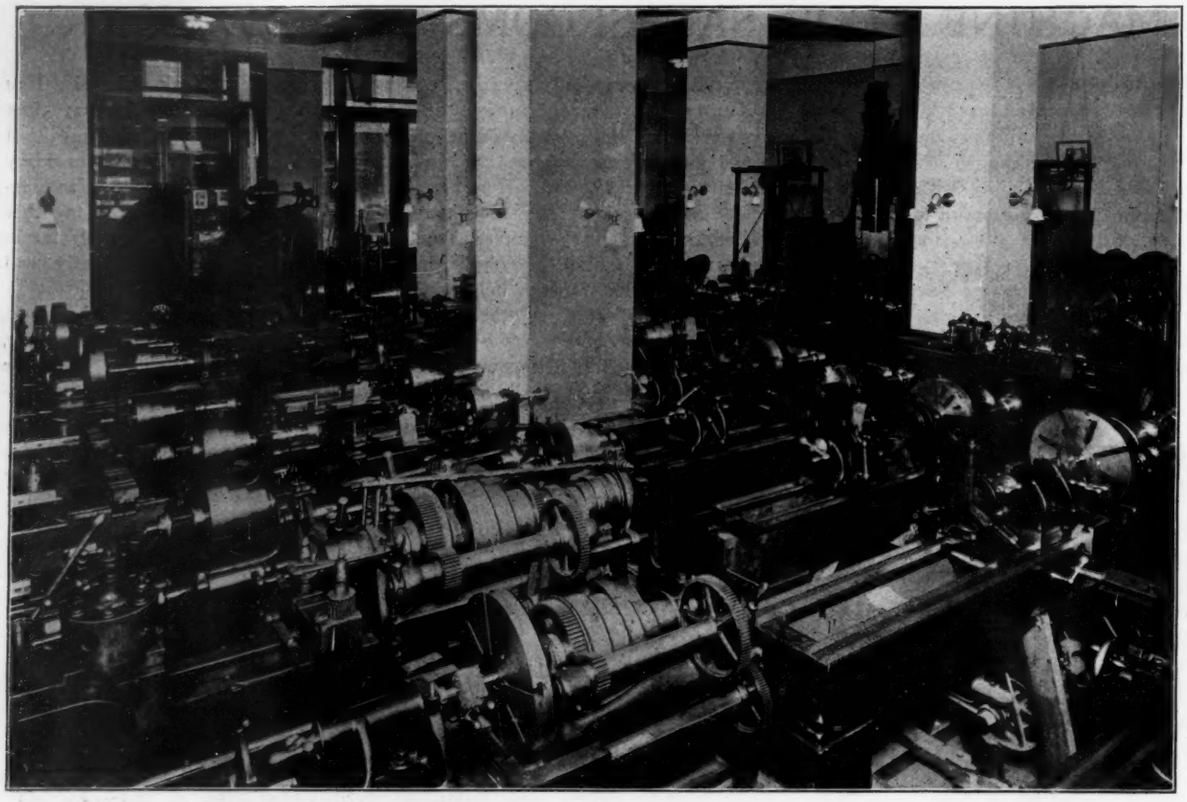


FIG. 2—SHOW ROOM ON LIBERTY STREET OF THE VAN DYCK-CHURCHILL CO., LOOKING TOWARD FRONT.

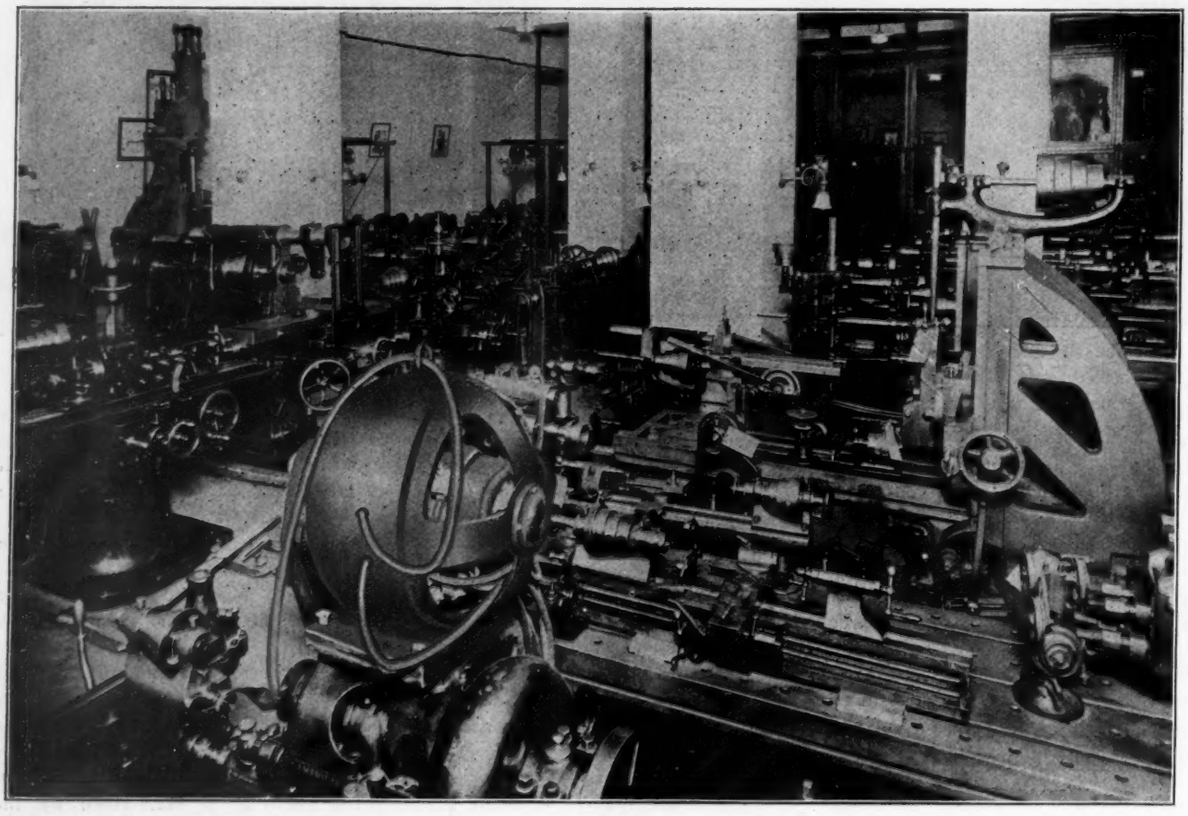


FIG. 3—SOME HEAVY TOOLS IN VAN DYCK-CHURCHILL CO.'S SHOW ROOM; OFFICES SHOWN AT REAR.

and examine practically every machine that he desires. A few hours' time is sufficient for him to make the round of the more important dealers and he is then qualified to make his decision. In case he desires to see any certain machine in operation, this is usually possible in the immediate neighborhood, for a point is made to have tools working under normal shop conditions at plants easily accessible to the city. Furthermore, in railroad shops have tried the showroom in years gone by, and have abandoned it after a thorough trial.

For the dealer who represents chiefly the builders of standard machine tools and depends for his trade upon the general market, the showroom has amply demonstrated its efficiency. Aside from the ease with which it permits the showing of machinery, it is frequently a powerful selling assistant in suggesting to the prospective purchaser of one machine other tools on the floor which would fit well into the equipment of his shop.

Along this line, it is rather a surprising fact, but nevertheless one repeatedly demonstrated, that careful attention to the selection of tools placed in or near the windows have resulted in attracting in prospective purchasers who otherwise could not have been reached. A professional window-trimmer for the machine tool showroom has not yet appeared, but the tendency is strongly that way. A maker of wire rope, whose products are displayed with considerable care in a location passed daily by the tenants and visitors of a large office building, can trace no unimportant number of customers to this influence. Frequently in the machine tool showroom the window space is occupied by a glass showcase containing some particularly well finished bench machine, or a variety of small machines, a practice which is productive of good results. The association in the mind of the some-time possible purchaser of the location and the fact that there machine tools are sold is a constant achievement of the showroom and is a factor of prime importance in the brisk competition of present day selling.

During the industrial depression of the year just ended, when the outlay for new equipment was almost a negligible amount, dealers found it possible to make occasional sales of second-hand machinery, and it was due to this branch of the trade that sufficient business could be done to keep organizations together until a renewal of activities. In this connection the showroom is of particular assistance. Allowing, as it does, the display of used equipment, after it has been put in good order, at a place convenient for its careful examination by the purchaser, the showroom has been directly responsible for important sales which otherwise

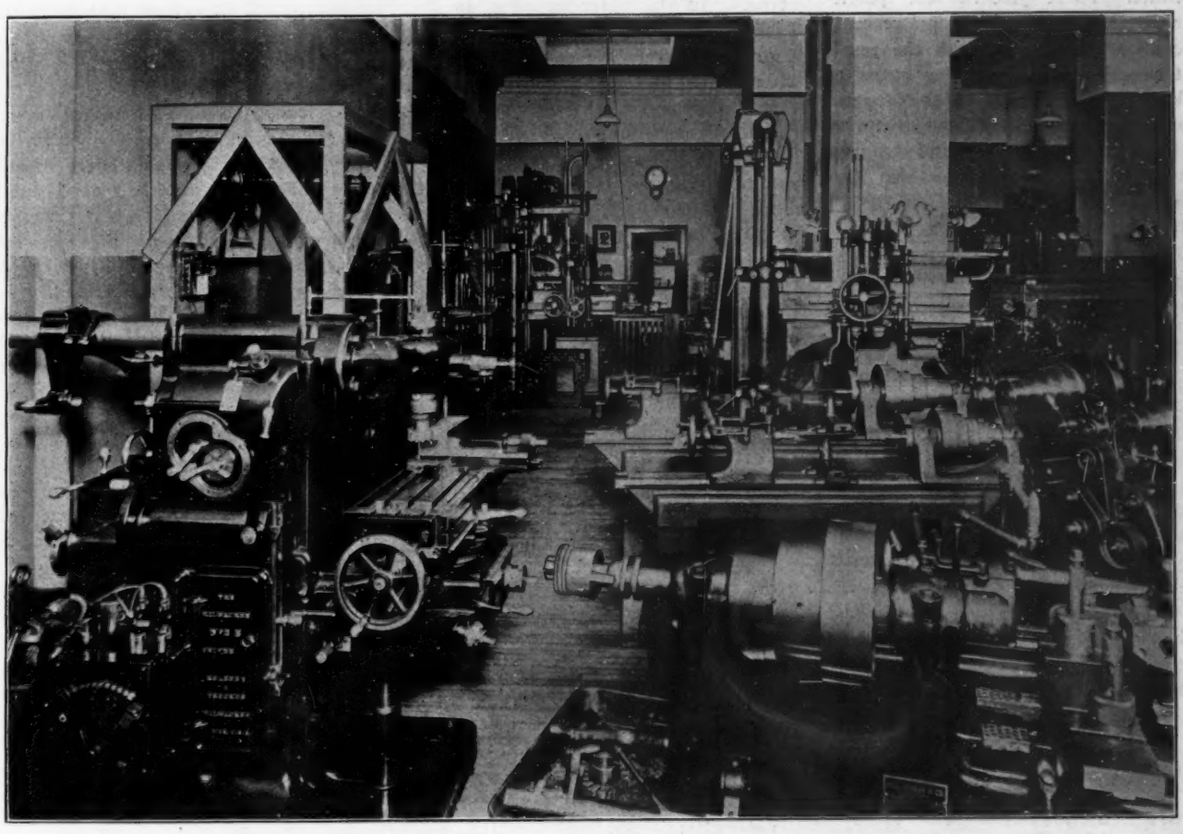


FIG. 4—SHOW ROOM OCCUPYING GROUND FLOOR OF A SKYSCRAPER, HILL, CLARKE & CO.

practically all of the large showrooms, power facilities are provided and the actual work of the machine can be demonstrated with either motor or belt drive. Dealers state that they have found this feature of very great benefit.

Naturally, the limitations of space restrict the stock that can be carried and it is usually possible to show only the standard lines of the various manufacturers which the dealer represents. For the makers of extremely heavy machinery the showroom is not practicable, nor can it be employed successfully, for obvious reasons, where the product is chiefly special machinery. Two New York houses which make a specialty of building to meet the exacting requirements of

would hardly have been possible. A few large houses maintain stores in several centers. These can absorb and quickly dispose of entire shop equipments which now and then are thrown on the market.

One other advantage offered by the showroom which is worthy of mention is the opportunity it affords for the displaying of new designs in a way to attract wide attention. One New York house placards its tools with the name of the maker and the machine. These placards call particular attention to each design recently placed on the market, with the result that practically every caller stops to look at the machine and the demonstrator has an excellent opportunity to point out its novel and original features. This same house also designates its second-hand equipment by suitable placards.

Of course the machine tool showroom has its limitations. At most it is only an aid and convenience in selling. It cannot render unnecessary the constant activity of the traveling representative; neither can it displace the careful watch for new concerns which promise to need equipment, the judicious use of publicity and the several other methods which have become a part of the modern selling practice. It has its difficulties, and these are frequently of importance. One is found in the frequent insistence of a customer to have shipped to him the identical machine examined in the showroom, instead of another from the factory. Mechanical difficulties are also frequently met. Only the other day in a showroom on the substantial floor of a comparatively new building it was necessary to construct a large platform to distribute the weight of a heavy power hammer, the regular base of which was not sufficiently large to render safe the erection of the machine on the floor proper, although it was designed to sustain 250 pounds per square foot. The transfer of this hammer into the showroom and its erection was accomplished with no difficulty. But, even with these limitations, the fact remains that the showroom in the large cities is an extremely valuable adjunct to the machine tool trade and there is every reason to believe that it is a permanent and growing institution.

In New York city, Liberty street has long been popularly designated as the machine tool thoroughfare, just as Wall street enjoys a similar distinction in the financial field or Greene and Leonard and Worth streets in the drygoods trade. As a matter of fact, however, Liberty street has a good claim to this distinction, for its three short blocks between Broadway and the North river undoubtedly are given over to the machinery trade more completely than any other district in the city.

The great Singer office building at its intersection with Broadway includes among its thousands of tenants a very large number of iron, steel, machine tool and equipment concerns. In the older building on the Liberty street side it houses on two floors the general offices of Manning, Maxwell & Moore, Inc. Adjacent to this building is the handsome showroom of the Vandyck-Churchill Co., occupying a large frontage and accommodating an extremely important stock. Offices of this company are at the rear of the showroom. Just across the street is the building entirely occupied by the offices of the Lidgerwood Manufacturing Co., maker of hoisting equipment.

Only a block distant on Church street are the new Hudson Terminal buildings, a very considerable part of which is occupied by machine tool and allied concerns. The top floors of one building house the Railway Club. The upper floors of the other are the home of the Machinery Club, opened about a year ago and now having a membership of over 1,000, doubtless the most representative organization of the machinery men of America ever formed. Nearby on Dey street is the showroom of the Frevert Machine Co.

A little further down Liberty street is located the Prentiss Tool & Supply Co., and two large office structures, the Electrical building and the Engineering building, both largely tenanted as their names imply. The West street building, another important machine tool center, is only a block distant. Its ground floor is given over to the offices and large showroom of Hill, Clark & Co., Wickes Bros. and the A. Leschen & Sons Wire Rope Co.

Within a few minutes of this center practically all the other machine tool houses are located, prominent among them being the Fairbanks Co., at Broome and Lafayette streets, and the Garvin Machine Co., which maintains an attractive showroom on the ground floor of its factory building at Spring and Varick streets. This list is by no means complete, the intention of the article being merely to point out and illustrate one noteworthy feature in the trade.

MIXTURE FOR BEARING METALS AND METHOD OF MELTING.

A certain concern had considerable trouble making babbitt metal containing a small percentage of lead. At times the metal was satisfactory, but as a rule was brittle and the fracture by no means uniform. The presumption was that the copper should be melted first, antimony next, and then lead and tin. The concern inquired if it would be possible to add enough tin with the copper to make a high tin alloy and then to add the other metals and in what manner should this be done.

The trouble could be located more easily and a remedy suggested if there had been given a formula. There should be no difficulty in making a good satisfactory babbitt containing the metals mentioned. The writer will presume that the formula is at fault and is inclined to believe that it runs too high in copper, as that would cause the trouble stated. If the copper runs as high as 10 per cent, reduce it by one-half. Babbitt metals are made containing over 10 per cent copper, and although they possess great compressive strength they run sluggish and cannot be recommended for general use. An excellent babbitt mixture for heavy work follows: copper, 3.75 per cent; antimony, 10.50 per cent; lead, 25 per cent; tin, 60.75 per cent.

Melt the copper first, add 20 per cent of tin gradually so as not to freeze the melted copper, then add antimony and the balance of tin can next be added, but, if the tin is melted in an iron kettle "the hardening" is added thereto direct from the crucible in which it was melted. When the entire heat of babbitt is made in the crucible there is danger of overheating, as the crucible becomes very hot in melting the copper, and therefore the pot should be removed from the fire before all the tin is added, so that when the metal becomes super-heated from the red-hot walls of the crucible, cold metal will be at hand to cool it to a proper casting temperature. When melting the copper in tin babbitt mixtures keep covered with charcoal and add either the antimony alone or with a portion of the tin to form the "hardening," the idea being first not to freeze the copper, and second not to over-heat the more fusible metals. Lead babbitts are not so troublesome as they rarely contain copper because it makes them run sluggish. For a lead babbitt, melt a portion of the lead first, get it ready, then add the antimony which immediately dissolves, add the balance of the lead and finally the tin. Magnolia metal is a typical lead babbitt mixture and contains lead, 80 per cent; antimony, 15 per cent, and tin 5 per cent.

ELECTRIC MAIN DRIVES IN GERMAN MILLS—I

A Discussion of the Features Attending the Development of the Electric Drive—This Section Treats of the Generating End

By Eugene Eichel.[1]

The application of electricity to the operation of new machinery has been developed to such an extent in Europe that it is only possible to touch on some of the more important questions of this broad subject in a paper of this character. Inasmuch as the main development was carried on in Germany, the author will restrict himself practically to German plants. The reason of the growth of Germany's iron industry is due largely to the steadily increasing demand, not only of the iron and steel industry itself and the railways, but also to its ship building trade.

During the depression of 1901 and 1902 the steel works brought their equipment up to the highest possible efficiency in order to meet the expected demand of later years and to successfully compete with British makers. The German electrical industry was forced, at the same time, by reason of poor business, to seek new customers. The power station business for lighting, power and traction purposes was slow and unprofitable, and it was necessary to develop a new field for large electrical equipments. This field was found in the mining and steel mill industries, which are continual consumers of apparatus, due either to necessary enlargements of existing plants, or to the necessity of replacing obsolete and worn out machinery. The mills are usually spread over large areas, necessitating either a number of sources of power at the individual plants, or a central power station for generating energy to be easily and economically transmitted over long distances without inconvenience. As electricity is undoubtedly the most suitable form of energy, the electrical concerns which sought this business had not much difficutty in convincing prospective customers of the advantages of the central power station, or of the advantage effected by the scrapping of a multitude of scattered boiler plants and low-efficiency steam engines.

Advantage of Electric Drives.

The steady torque of the electric motor, preferably applied in the rugged form of the totally enclosed type, is particularly advantageous for most of the smaller applications in the driving of mill machinery. The direct-current, series-wound motor of comparatively small capacity and developed from the railway motor was the first to enter the steel mill. The successful application and satisfactory operation of these machines for driving conveying apparatus, such as cranes, live rolls, tables, etc., facilitated the introduction of larger machines for direct-connected or rope driving of low capacity mill trains.

The main drive of large three-high trains showed the great convenience afforded by the "all-electric" mill operation, an ideal condition. While the three-high roll drive represents

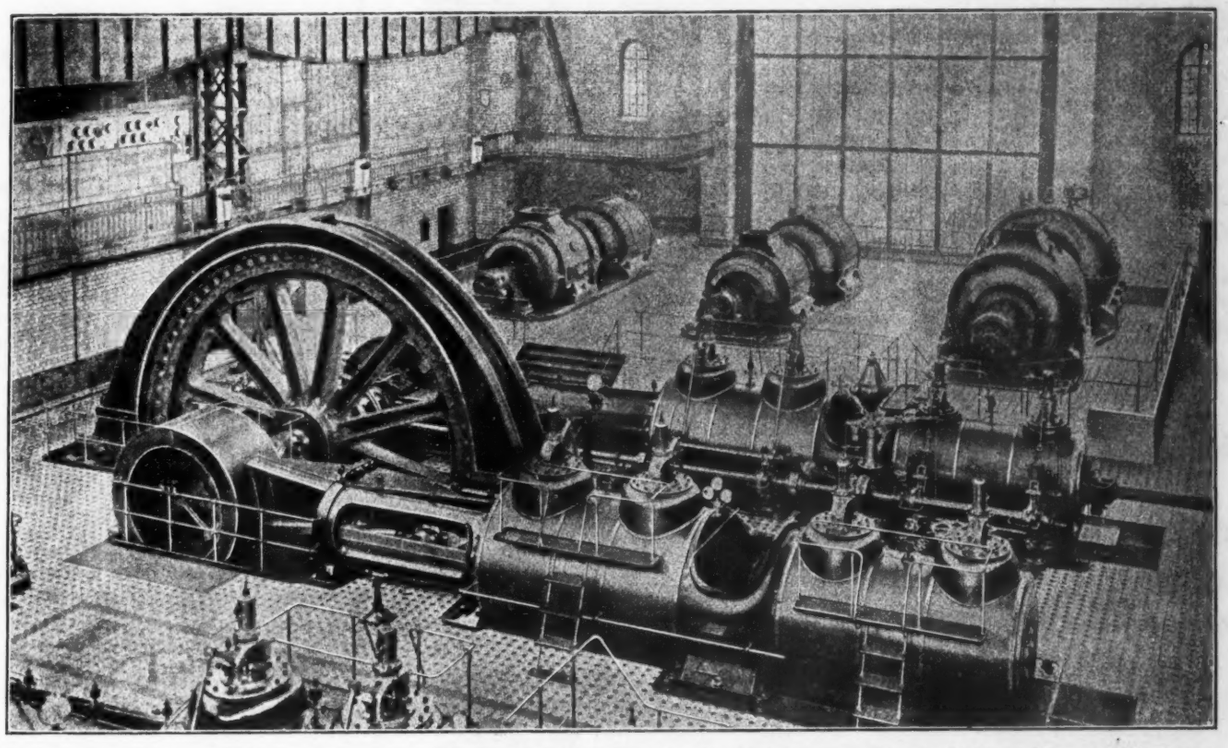


Fig. 1—Comparison of Space Required by Engine and Turbine-Driven Alternator; Engine-Driven Unit, 3,000-Horsepower; Turbine-Driven Units Left to Right, 4,000, 6,000 and 9,000 Horsepower.

[1]Consulting engineer, Alte Jacobstr, 106, Berlin S W.

hard work for the electric motor and the power house, being a load of slightly fluctuating character, the most difficult problem to be solved is the proper drive for large two-high reversing rolls of universal blooming and plate mills for rolling ingots into blooms and slabs. In this type of mill, requiring several thousand horsepower, the heavy motor must not only sustain the widely fluctuating jerky load and the high peaks required particularly during the first passes, but it must also be capable of reversal within short intervals of time and of being operated at full load in either rotating direction.

Analogy Between Steel Mill and Hoist Drive Conditions.

The precedent for the solution of the above problem, to some extent, was in the driving of main hoisting engines, whose operation represents a continuous alternation from heavy peak-loads and short mean-power requirements, to brief no-load periods. The hoisting engine pause, however, between loads in one direction and in the reverse direction is always of relatively long duration, being at least a few minutes, while the reversal of the rolling mill motor must be effected within a few seconds. While the hoist motor is usually operated at a low speed of 30 to 40 revolutions per minute maximum, the two-high roll motors work at a considerably higher speed, which increases the difficulty of the sudden reversal. The problem of the roll drive includes not only the choice of the proper motor, which will successfully withstand the rough usage incident to rolling mill operation, but it has to take into consideration the second important problem of equalizing an unsteady load demand with regard to the supply network and the power house machinery.

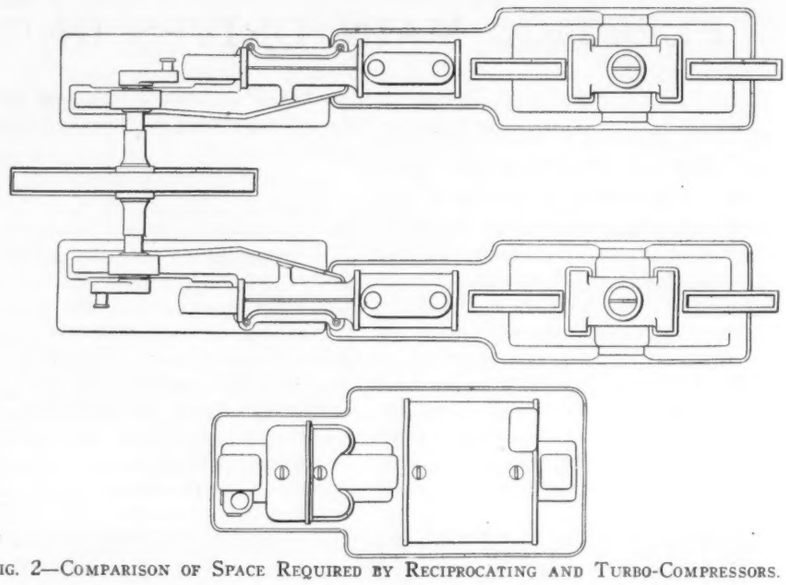


FIG. 2—COMPARISON OF SPACE REQUIRED BY RECIPROCATING AND TURBO-COMPRESSORS.

Speed Control of Motors.

For the speed control of motors use had previously been made of the Ward Leonard control under similar load conditions, for instance, with main hoists and with the operation of paper machines and gun turrets on shipboard. This control system permits the gradual increase or decrease of speed in either direction of rotation and of a quick reversal of the motor, by means of a very convenient field control, thus requiring the handling of a relatively low current, and in consequence small control apparatus. Direct-current motors, therefore, are best suited for variable speed drives, their speed control being easily and economically effected, by means of the above mentioned field control system.

The equalization of the load fluctuations can be taken care of either by boosters and storage batteries, or as is done in all of the existing reversing rolling mill drives by means of fly wheel converters, comprising: A driving motor, which can be either of the direct-current or three-phase induction type, or it may even be a steam engine, steam turbine or water wheel. Direct connected to the shaft of this motor must be a heavy fly wheel and the generator to supply current to the roll motor. The general practice is to subdivide this generator into two or more units, which facilitates good commutation and allows for a certain reserve capacity, as the breakdown of one generator means only the loss of one-half of

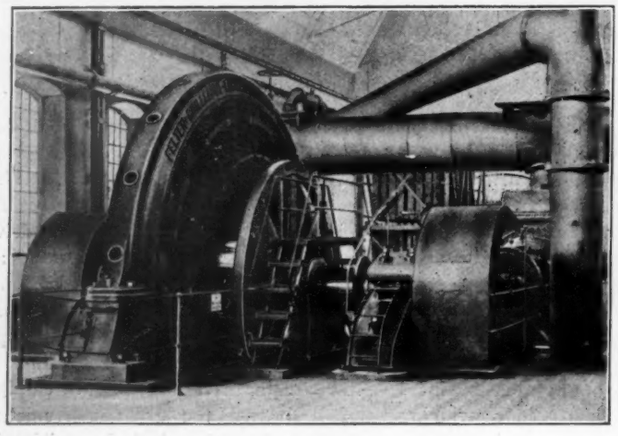


FIG. 3—MOTOR-DRIVEN BLOWING ENGINE EQUIPMENT FOR THOMAS CONVERTER PLANT OF PEINE MILL.

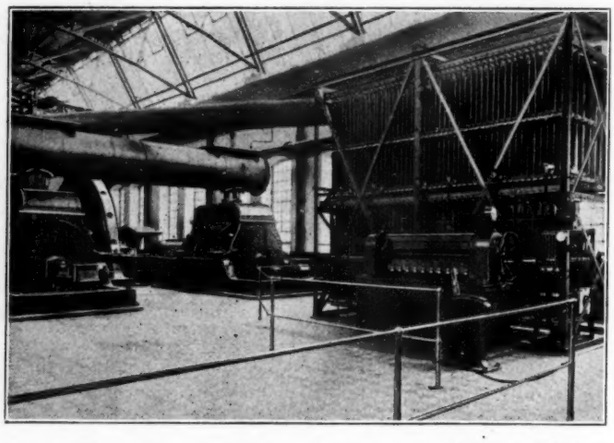


FIG. 4—RESISTANCE FOR SPEED CONTROL OF BLOWING ENGINE IN FIG. 3 AND ALSO 9-POINT CONTROLLER WITH AUXILIARY LIQUID RESISTANCE.

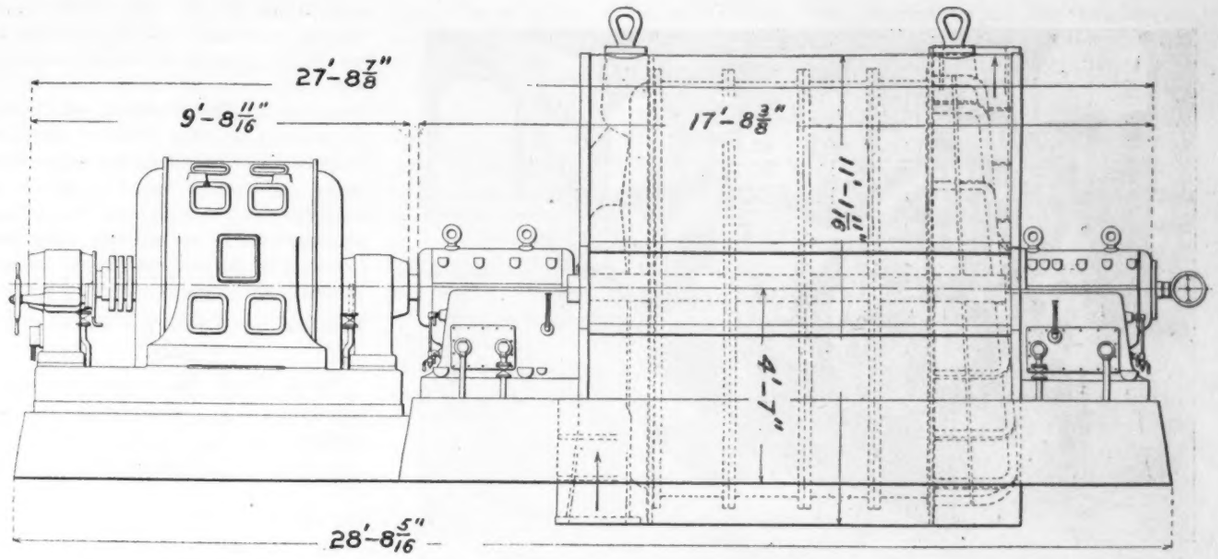


FIG. 5—SPACE REQUIRED BY HIGH PRESSURE TURBINE BLOWER OF 12,000 CUBIC FEET PER MINUTE CAPACITY.

the entire output of the fly wheel converter set.

In a similar manner the roll motor is usually subdivided into several units. In this case it is not only the reserve capacity available in emergencies which governs, but also the necessity to reduce as much as possible the fly wheel masses, which must be reversed from full speed in one direction to full speed in the opposite. Recently, there have been made some suggestions as to the use of variable speed induction motors with direct-connected auxiliary direct-current motors, whereby speed decreases and increased slip is made of practical use by feeding from the slip rings of the wound rotor of the induction motor, a small rotary converter, which in turn, supplies the first mentioned direct-current motor, thereby assisting the low speed torque available at the induction motor axle.

The Power House Problem.

Naturally the load factor and the amount of load fluctuation to be cared for by the power house depends upon the layout of the mill and increases or decreases, respectively, and advantageously with the aggregate horsepower of the motors connected to the mill network. As better conditions exist the more motors that are connected, it is of particular advantage to have besides the heavily fluctuating load consisting of the few large main roll drives, a large number of small motors whose operations overlap to such an extent that they constitute a relatively steady and continuous ground load. This increases the all-around efficiency by decreasing the production cost per kilowatt hour generated and causes the power station equipment to be used to the best advantage.

The earlier type of power house equipment, the low speed reciprocating steam engine, is slowly but surely being superseded by the two latest types of prime movers, the steam turbine and the gas engine. The enormous space economy, the large overload capacity and the high efficiency of the turbine, as compared with the reciprocating engine, are largely responsible for the tendency to prefer in new plants the installation of steam turbines. The steam turbine is also peculiarly suitable as a substitute for obsolete power house equipment in that it is possible to install in the space available, after removing an engine, steam turbines of many times the output of the reciprocating plant.

Advantages of the Steam Turbine.

An instance of this is shown in Fig. 1, which is part of the interior of a most modern power house, in which one of the initial equipments compris-

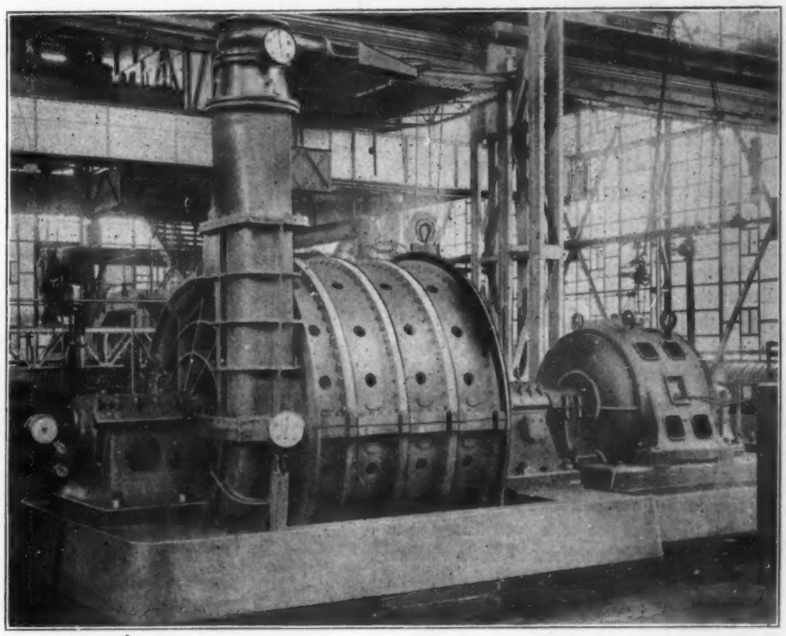


FIG. 6—CENTRIFUGAL BLOWING ENGINE OF 42,384 CUBIC FEET PER MINUTE CAPACITY DIRECT-CONNECTED TO 1,800-HORSEPOWER, THREE-PHASE MOTOR.

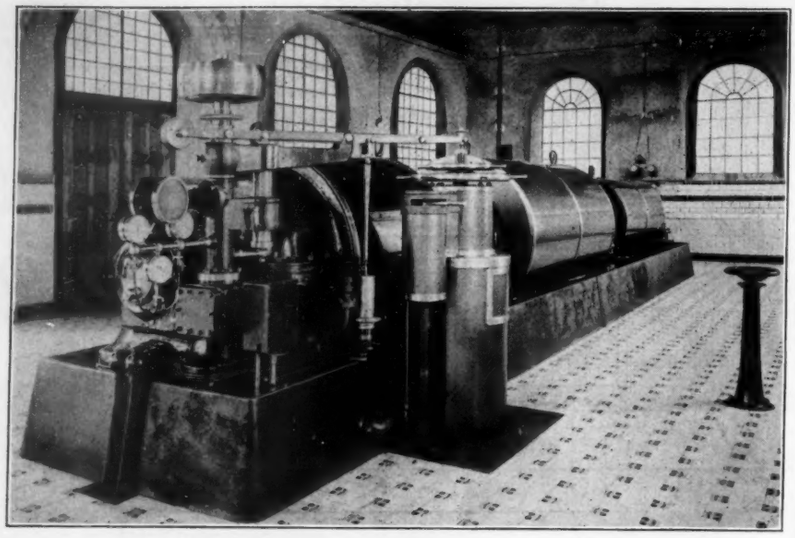


FIG. 7—GUTE HOFFNUNGS MILL; STEAM-TURBINE-DRIVEN COMPRESSOR, CAPACITY 282,560 CUBIC FEET PER MINUTE.

es a 3,000-horsepower, high-efficiency steam engine installed a few years ago for driving an alternator at 83 revolutions per minute. Adjacent to this engine, and installed in the space originally reserved for extension with a similar engine, are installed three Allgemeine Elektr. Gesellschaft Curtis turbine alternators, which have been installed from time to time, according to requirements, within the past three years. The turbines have a rated capacity of 4,500, 6,000 and 9,000 horsepower, respectively, and are operated at 1,500, 1,500 and 1,000 revolutions per minute, respectively. Their direct-connected alternators furnish 50-cycle, three-phase current at 6,000 volts. It is evident that it would be possible to install three steam turbine units of 9,000 horsepower capacity each in the space originally provided for generating 3,000 horsepower by means of one reciprocating engine.

Steam turbines, principally used in European plants, are of the Parsons type, built in Germany by Brown, Boveri & Co.; of the Curtis type, built by the Allgemeine Elektr. Gesellschaft; of the Zoelly type originally developed by Escher, Wyss & Co., and now built by a syndicate, with the Augsburg-Nurnberg Works as one of the main members. The number of steam turbines of the various types installed up to October, 1907, is shown in the following table:

Type.	Number.	Aggregate capacity.
Zoelly	206	313,500
Curtis	570	731,000
Parsons	800	1,700,000*

*Including 291,000 horsepower for ship drive and a few thousand horsepower for compressor drive.

The steam turbine has proved useful not only for the drive of electric generators, but also for stimulating the design of centrifugal blowing engines and compressors. The centrifugal air compressor development is due, to a great extent, to Parsons and to the French scientist, Prof. Rateau, inventor of the Rateau turbine, built by the Swiss Oerlikon Machine Works. Rateau compressors of large size are built in Germany, particularly by the Gute Hoffnungs mill. A large number of turbo-compressors developed by Parsons are operated in English mills. A size often required for blast furnace operation is one furnishing 50,000 cubic feet of air per minute at 10 to 50 pounds pressure per square inch and weighing but 25 tons, as against 450 tons for the reciprocating type. Analogous to the development of the steam turbine, the first trials of the turbo-compressor showed enormous space economy as one of its great advantages, compared with reciprocating compressors of the same output. The efficiency, which was not as high as that obtained with the reciprocating machines, has now been raised to such a point that, if all conditions are considered, the design of compressors has already been perfected to a point close to the results obtained with reciprocating machines.

The Electric Drive for Blowing Engines.

Fig. 2 shows the comparative space requirements of reciprocating and centrifugal blowing engines and compressors. Figs. 3 and 4 show a modern blowing engine equipment for the Thomas converter plant of the Peine mill for compressing 28,256 cubic feet per minute up to 35 pounds per square inch. The compressor is driven by a 2,000-horsepower, 500-volt variable-speed, direct-current motor, with a speed range from 22 to 80 revolutions per minute, the normal speed being 50 revolutions per minute.

This motor, built by the Felten & Guilleaume Lahmeyer Works, has a total weight of 94.7 gross tons, its armature weighing 37.73 tons. The field frame diameter is 28 feet 8 inches, and that of the armature is 15 feet 1 inch. The motor output is 2,000 horsepower, when operating between 50 and 80 revolutions per minute, 1,500 horsepower at 40 revolutions per minute and 600 horsepower at 22 revolutions per minute. Operated at 80 revolutions per minute its full load efficiency is 94.6 per cent. The wide speed variation, which is required for obtaining various pressures—for instance, during blasts of 13 minutes duration, the speed and pressure are increased from 43 revo-

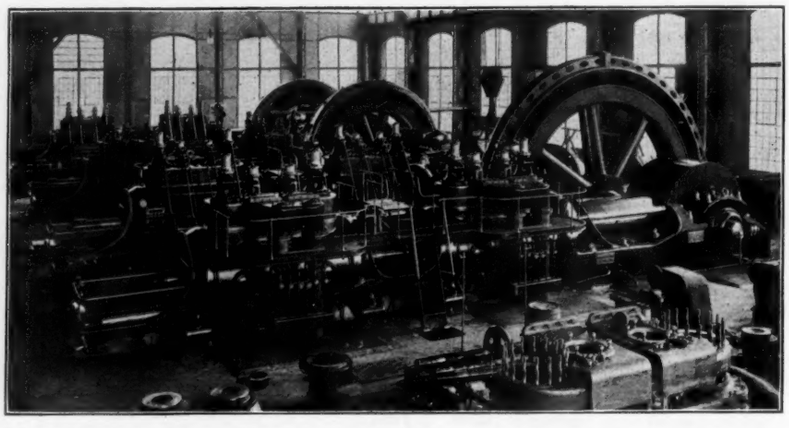


FIG. 8—THREE 2,000-HORSEPOWER TWIN-TANDEM ENGINES RUNNING AT 95 REVOLUTIONS PER MINUTE, DIRECT-CONNECTED TO FLY WHEEL GENERATORS.

lutions per minute and 20 pounds per square inch to 70 revolutions per minute and 32 pounds per square inch—is effected up to 40 revolutions per minute, by means of plain rheostatic control.

The actual operating speeds above 40 revolutions per minute are regulated by means of the most economical field control. The large resistance required for speed control is shown at the right of Fig. 4, which also shows the nine-point controller with auxiliary liquid resistance under the slide contact. This is inserted between the adjacent contact blades, while passing from one operating point to the next. The small hand wheel underneath the big rheostat wheels serves for the field control and the cross handle for operating the main circuit breaker.

In contrast with this reciprocating unit, Figs. 5 and 6 show a centrifugal compressor designed by the Gute Hoffnungs mill. This has a capacity of 42,384 cubic feet of air per minute. It is direct-connected to an 1,800-horsepower, 3,000-volt, three-phase motor running at 1,480 revolutions per minute. The total length of this unit is 28 feet 8 inches. The three-phase induction motor, however, is not suited for the economical variation of speed, and in cases where such speed control is required, it would seem more advantageous to drive the compressor directly by means of a steam turbine. Fig. 7 shows such a turbo-compressor built by the Gute Hoffnungs mill, with a capacity of 282,560 cubic feet of air per minute at a pressure of 100 pounds per square inch.

The Gas Engine as a Factor in Electric Drives.

The comparatively largest development of modern power house equipments for mines and mills has taken place within the last five years. This development consisted in the making practical use of large gas engines operating on blast furnace or coke oven gases. Several of the first engines are also used for the operation of blowing engines. The latest development seems to point to the use of gas-engine-driven blowing engines as main units and turbine-driven centrifugal compressors as auxiliaries or reserves for the main blowing engine equipment.

This practice has an analogy in the pumping plant practice of important German mines, since the large reciprocating slow speed pumps were first supplemented by an auxiliary consisting of a high speed, motor-driven centrifugal pump. The latter has the advantage of great space economy, the disadvantage of difficult speed regulation and of a somewhat lower efficiency than the centrifugal pump, when compared with the low speed reciprocating unit. The efficiency of the centrifugal pump, however, has been greatly increased of late, and its use as a main pump is steadily increasing. The most important European manufacturer of centrifugal pumps, Sulzer Brothers, Winterthur, Switzerland, supplied up to January, 1908, a total aggregate capacity of 200,000 horsepower in high pressure centrifugal pumps. The largest plant installed comprised two pumps, each with a capacity of 2,640 gallons per minute, against a manometric head of 1,530 feet. Each of these Sulzer pumps is direct-driven by a 1,410-horsepower, three-phase induction motor.

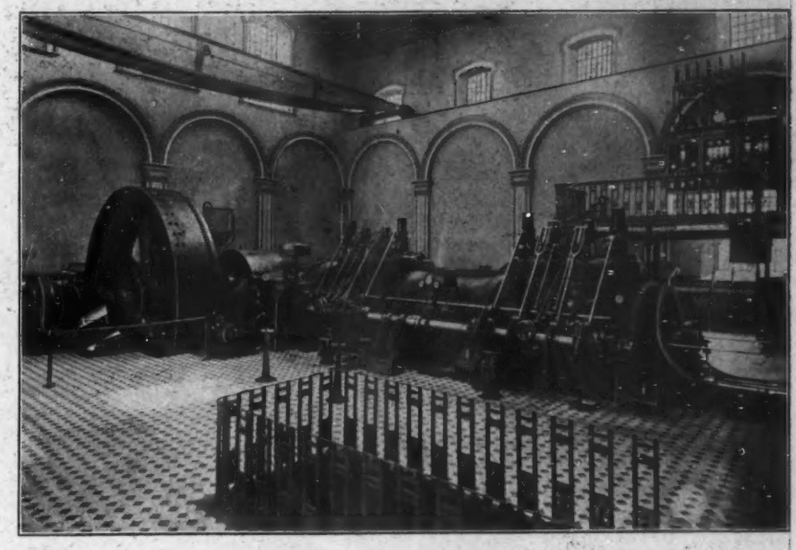


FIG. 9—AUGSBURG-NURNBERG GAS ENGINE DIRECT-CONNECTED TO EXTERNAL ROTATING FIELD, THREE-PHASE GENERATOR.

Extent of German Gas Engine Industry.

The large gas engine has proved to be a most economical machine, and its operation can be considered satisfactory as regards reliability of service, so long as the plant is in charge of an engineer who is experienced and conscientious in the maintenance of the engine, who pays proper attention to the characteristics of the engine, which is rather sensitive as regards cleanliness of gas, proper adjustment of gas mixture, and which requires ample lubrication and a constant supply of cooling water. The importance of the gas engine question is evident from the statistics of some of the German manufacturers of large engines. For instance, the Augsburg-Nurnberg Machine Works and its foreign allies, furnished up to October, 1908, 245 engines with an aggregate capacity of 306,370 horsepower. The largest unit was of 3,600 horsepower capacity at a speed range of 50 to 90 revolutions per minute, when used as a blowing engine and of 2,600 horsepower at 94 revolutions when used for the direct driving of electric generators.

Haniel & Lueg have built, or on order since 1903, 33 engines, aggregating 51,000 horsepower. The largest plant installed comprises three engine units of 4,000 horsepower at 94 revolutions per minute for driving three-phase alternators. This installation is shown in Fig. 8. Koerting Bros. started manufacturing small gas engines a few years ago. They have turned out a total of 8,000 engines, with an aggregate capacity of 400,000 horsepower. Their largest machines are 1,500 horsepower at 75 revolutions per minute in single-cylinder, two-cycle tandem engines and 1,800 horsepower at 80 revolutions in the twin-tandem units. About 50 per cent of the total number of engines and the greater part of the horsepower is comprised in gas-electric units.

The Siegener Maschinenfabrik builds especially two-cycle gas-engine-driven blowing engines and has furnished engines of an aggregate capacity of 35,000 horsepower and single units of

1,800 horsepower. Thyssen & Co. have manufactured up to January, 1908, gas engines of the modified Nuremberg type, totaling 47 units, with an aggregate capacity of 90,700 horsepower and a maximum output per unit of 2,600 horsepower at 94 revolutions per minute. Sixteen German manufacturers had installed, or on order, in August, 1908, a total of more than 400 gas engines, with an output per single unit of at least 1,000 horsepower each, and with a total aggregate capacity of about 615,000 horsepower.

	Brake horsepower.
United States	4,300,000
Germany	2,260,000
England	2,000,000
France	450,000
Russia	360,000
Belgium	280,000
Austria-Hungary	235,000
Spain	70,000
Italy	65,000
Sweden	60,000

This table is based on the iron and coke production of 1906. The chart from which this table was prepared also shows a geographical distribution of 300,000 horsepower in Nurnberg engines installed up to September, 1908, in various parts of Europe and America. The greater number of all large gas engines for operation on blast furnace and coke oven gas are built on the four-cycle, tandem or twin-tandem principle, a type which has been developed to its present standing principally by the Augsburg-Nurnberg Machine Works. The following table compiled from a graphic chart issued by one of the Nuremberg Germany gas engine manufacturers shows the total horsepower, which could be obtained from existing blast furnaces and in ovens in various parts of the world:

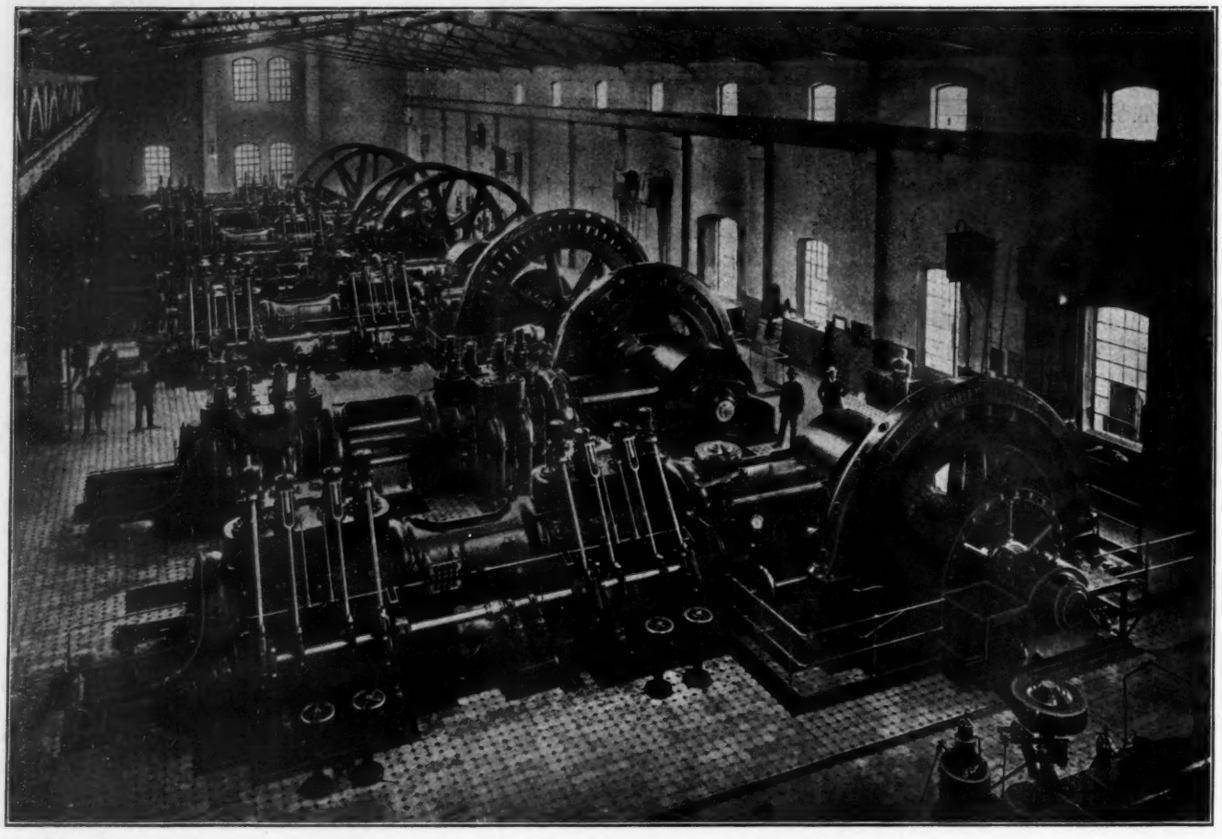


FIG. 10—INTERIOR OF POWER HOUSE OF ROMBACH MILL.

number of these engines are for the direct operation of electric generators, thus facilitating the most flexible and economical transmission of energy from the gases formerly wasted into the atmosphere. Heavy fly wheel masses are necessary to equalize the uneven torque of the engine crank and a special type of generator is frequently used in which the revolving field of alternators, or the armature of direct-current machines are built of large diameter, their spider having a heavy rim to act as a fly wheel.

Electric Generators for Steel Mill Work.

Besides these generators, there are available a number of special designs, for instance, the externally rotating field type of three-phase alternator built by the Allgemeine Elektr. Gesellschaft. The stator or armature is bolted to a bracket provided on the main bearing and the rotating field is designed as a heavy fly wheel with a rim extended sidewise, upon the inside of which are mounted field poles. These machines combine a relatively small diameter with large fly-wheel masses and permit of running the gas engine without a fly wheel.

Fig. 9 is a portion of the interior of the power house of the Bargoed colliery, containing one 1,200 and two 2,400-horsepower Augsburg-Nurnberg gas engines, direct-connected to three-phase alternators of the above described type and running at 100 revolutions per minute. Fig. 10 is the interior of the power house of the Rombach mill operating 15 Augsburg-Nurnberg gas engines, ranging between 850 and 3,600 horsepower capacity each and operating blast fur-

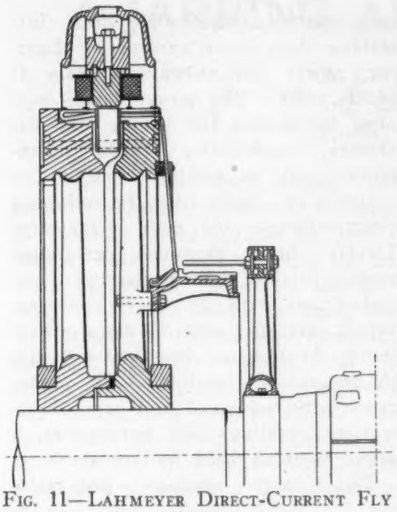


FIG. 11—LAHMEYER DIRECT-CURRENT FLY WHEEL GENERATOR.

nace and converter blowing engines. They are also direct-connected to direct-current and three-phase generators of the fly wheel type.

The direct-current fly wheel generators of Felton & Guilleaume Lahmeyer Works are of particular interest. Details of these generators are shown in Figs. 11 and 12, from which it will be seen that the armature is designed as a heavy fly wheel, obviating the necessity of installing a special fly wheel, and reducing the width, which otherwise would be required for the gas engine units, including the generator and separate fly wheels. The space required by such a fly wheel, together with the ordinary lay-out of the moderate sized gas engine, is shown in Fig. 13, which is a plan of a portion of the power house of the Burbach mill. This mill has one 1,400-horsepower, 90-revolutions-per-minute roll drive gas engine, one 1,200-horsepower, 100-revolutions-per-minute, and two 2,300-horsepower, 95-revolutions-per-minute gas engines, the latter for direct driving of direct-current generators. Fig. 13 shows the 1,200-horsepower unit, with a separate fly wheel and direct-connected, direct-current generator. This is of particular interest in that it shows adjacent to the gas engine unit a Zoelly steam turbine generator of the same output, but operating at 1,550 revolutions per minute, furnishing 220-250-volt direct-current by means of two generators.

In spite of the disadvantage of having a direct-current dynamo subdivided into two units, the space required by the turbine unit is not larger than the waste space available alongside the gas engine unit. Similar conditions are shown in Fig. 14, which is the power house of the Fentscher mill, operating two 1,800-horsepower, 40/90-revolutions-per-minute, Augsburg-Nurnberg blowing engines and one 1,500-horsepower, 94-revolutions-per-minute gas engine, direct connected to a direct-current generator. The small space required by the turbine can be comprehended by comparing the gas-electric unit of 1,500-horsepower with the adjacent 1,800-horsepower, 3,000-revolutions-per-minute, 5,250-volt Allgemeine Elektr. Gesellschaft Curtis steam turbine alternator, with direct-connected exciter, three of which have been furnished to the mill. This high space economy compared with the space and heavy foundations required by gas engines, the saving in first cost of building and in maintenance of house and engines, the difficulties frequently met with in obtaining a sufficient supply of water suitable for cooling the gas engines and cleaning the blast furnace or coke oven gases, the small overload capacity of the gas engine units and the large number of trained attendants necessary with gas engines are all to be taken into consideration when deciding the type of equipment.

Gas Engines vs. Steam Turbines.

The high steam economy of the steam turbine reduces greatly the boiler capacity required, and the possibility of running the boilers ordinarily with furnace gas, with coal for emergencies only, is of special advantage for such works as have to count on troublesome furnace equipment and with frequent adverse trade conditions. In straight gas engine plants, producer gas installations are necessary as a reserve for taking care of emergencies and for such times as the furnaces are shut down. Otherwise, a sufficient reserve in boiler capacity and steam turbines must be provided. The turbine units can be kept floating on the main busses for taking care of overload peaks or for feeding certain sections of the network whose continuous service is of special importance. An efficient combination of the old-fashioned steam engine mill equipment with modern power house equipment is the use of steam storage plants for the exhaust of the reversing rolling mill engines to be used in connection with low pressure direct alternators. The above mentioned Rombach mill operates its gas engines, two 1,500-horsepower, 3,000-revolutions-per-minute, 5,700-volt Curtis, three-phase turbo-alternators, and also with the exhaust steam from the reversing rolling mill engines,

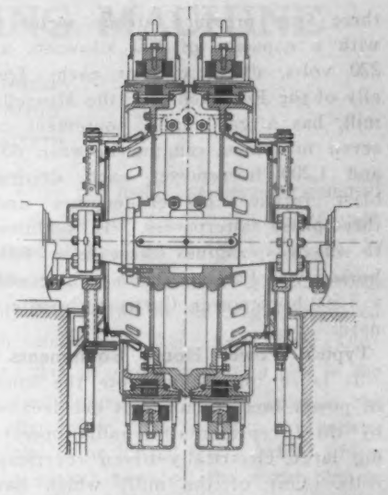


FIG. 12—LAHMEYER DIRECT-CURRENT FLY WHEEL GENERATOR 2,400 HORSEPOWER, 120 REVOLUTIONS PER MINUTE; ARMATURE WEIGHS 8,100 POUNDS.

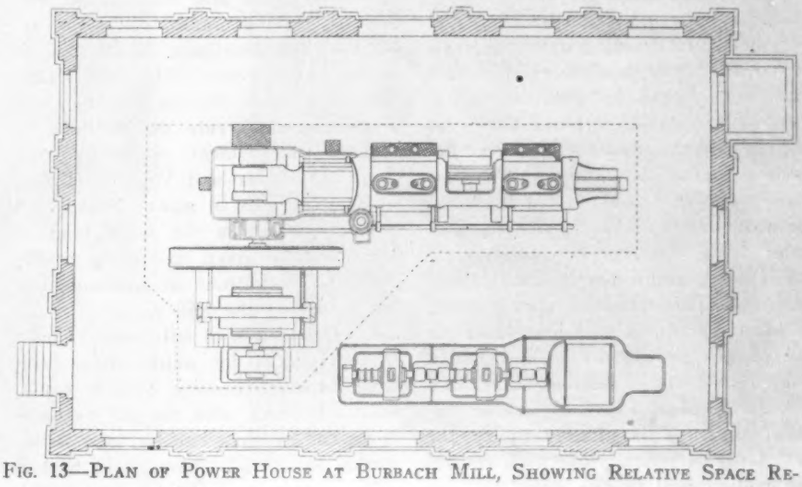


FIG. 13—PLAN OF POWER HOUSE AT BURBACH MILL, SHOWING RELATIVE SPACE REQUIRED BY 1,200-HORSEPOWER GAS ENGINE, 94 REVOLUTIONS PER MINUTE WITH DIRECT-CONNECTED GENERATOR AND 1,200-HORSEPOWER TURBO-GENERATOR, 1,550 REVOLUTIONS PER MINUTE.

three low pressure steam turbines, with a capacity of 600 kilowatts at 220 volts, direct current each. The ally of the Rombach mill, the Mosselle mill, has a gas engine equipment of seven machines, ranging between 600 and 1,200 horsepower each, driving blast furnace blower engines and three-phase alternators. In addition to the gas engines there is a 400-horsepower Parsons steam turbine and a 1,500-horsepower Curtis turbo-alternator.

Typical Power House Equipments.

It is of interest to note the kind of power house equipment decided on by three representative mills operating large electrically-driven reversing rolls. One of the mills which has recently modernized its entire equipment, is the Hildegarden mill at Trzynietz. In deciding upon the style of power house equipment, the fact that there could be obtained better delivery of steam turbines than gas engines was of influence. The equipment comprises a 3,000-kilowatt Parsons turbo-alternator and two 1,250-kilowatt Curtis turbo-alternators. The latter have a steam consumption of but 15.75 pounds per kilowatt hour measured at switchboard, with a steam pressure at the admission valve of 114 pounds per square inch, a steam temperature of 572 degrees Fahr., and a vacuum of 27.5 inches in the exhaust pipe. This plant supplies the first large electrically-operated reversing rolling mill in the world.

While the above mill has a straight steam turbine power house, the second large electrical reversing rolling mill, that of the Georges Marien mill, is supplied from a power house equipped with gas-engine-driven generators exclusively. Five of the six ultimate units are installed, each connected to a 1,200-horsepower direct-current generator operating at 110 revolutions per minute and 550 volts. The power plant at Rombach represents a combination equipment of both gas engines and turbo-generators, furnishing current to a third electrical reversing rolling mill, which is the largest yet built by the Allgemeine Elektr. Gesellschaft.

The above three mills not only have their reversing rolls electrically driven, but in addition a large load, comprising a number of three-high motor-driven mills and the electric motors for driving cranes, conveying apparatus and auxiliary machinery, is on the power house. The three examples cited show that at present there is no universal rule or standard as regards employment of either type of prime mover and kind of current to be generated in power houses. A certain preference for each kind of drive will be given, according to the particular conditions of operation and the layout of the mill proper.

A special class of mill power houses is represented by mills which have large furnace capacity, and in consequence produce with the gas available more energy than can be used in the works, the surplus being sold to outside customers. For instance, this is the case with the Rombach mill, which supplies the city of Metz over two separate transmission lines, furnishing three-phase current for lighting, power and railway purposes at 17,000 volts. The power house supplies 455 motors for driving mill machinery, aggregating 14,238 horsepower, and, in addition, four of its adjacent ore mines with the following electrically-operated main machinery: Twelve high pressure centrifugal pumps, totaling 2,800 horsepower; one main hoist with fly wheel converter supply, average input 375 horsepower; seven three-phase, direct current motor-generators, totaling 4,250 horsepower; 19 industrial and mine locomotives, totaling 1,930 horsepower, a grand total of 9,355 horsepower.

This plant contains principally three-phase generators, with a small direct-current equipment for the operation of cranes and for conveying apparatus. On the other hand, the Georges Marien mill power house is direct current throughout, although it runs the heavy electrically-driven reversing mill and a large number of rolls operated by uni-directional motors. Direct current was furnished in the earlier plants on account of the lack of experience with three-phase alternators and the difficulties of synchronizing large gas-engine-driven alternators in the earlier plants.

(To be continued.)

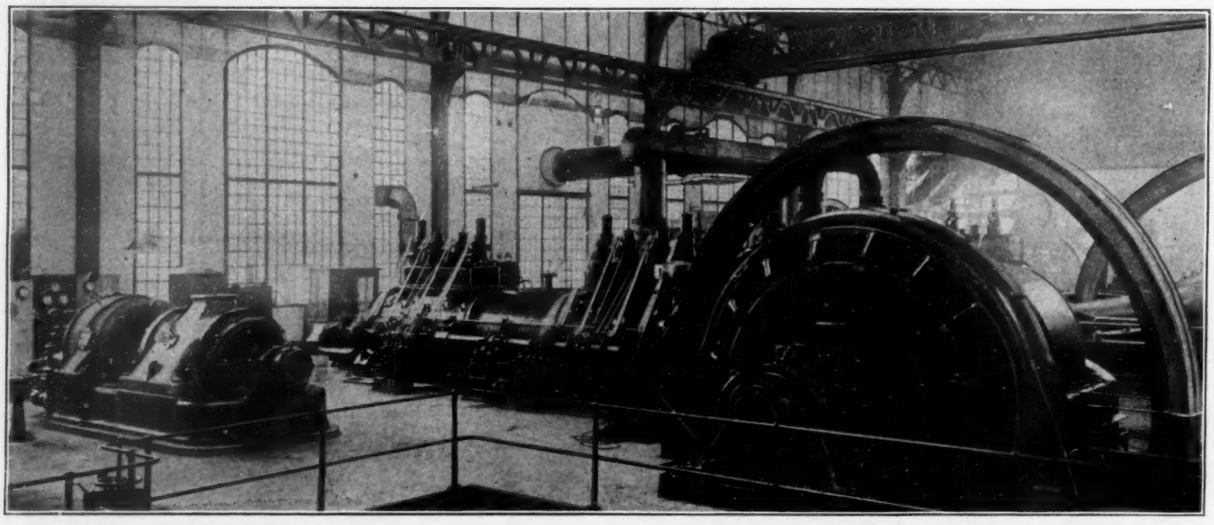


FIG. 14—FENTSCHER MILL; COMPARISON BETWEEN GAS ENGINE DIRECT-CONNECTED UNIT AND TURBO-GENERATOR. GAS ENGINE —1,500 HORSEPOWER, 94 REVOLUTIONS PER MINUTE; TURBINE—1,800 HORSEPOWER, 3,500 REVOLUTIONS PER MINUTE.

The United States Brake Shoe Co. has been granted a charter with $100,000 capital stock. The directors are: Louis Streuber, Erie, Pa.; J. J. Ressler and J. F. Austin, Corry, Pa.

A JARRING AND HINGED MOLDING MACHINE

A Large Combination Machine Designed for Molding Car Wheel Centers, Which Rams the Mold, Rolls Over the Flask and Draws the Pattern

A large combined jarring and hinged molding machine, designed to produce from 50 to 75 molds of car wheel centers per day of ten hours, operated by three men who formerly made eight molds by hand, has been installed by the Standard Steel Co., Burnham, Pa. The machine, built especially for molding car wheel centers can also be used on a great variety of work which does not exceed in weight the capacity of the roll-over cylinder, which would be a net weight of 2500 pounds including flask, pattern, bottom board and sand. The complete machine weighs 30,000 pounds and is set in a pit with the pattern plate level with the floor occupying a space, 7 x 12½ feet. It has a capacity for flasks from 36 to 44 inches, inside diameter.

This machine marks a distinct advance in the art of machine molding. By combining the Tabor jarring and hinged machines the production on certain classes of work can be multiplied many times. The jarring machine saves nearly all of the ramming time and the hinged machine saves time in pattern drawing and finishing, so that the combination of the two leaves very little for the molder to do besides shoveling sand and carrying away finished molds. To facilitate the rapid operation of machines of this type, sand should be brought to the machine by a conveyor or a clam-shell bucket on a traveling crane, and the molds removed by a hoist or crane.

Construction.

The machine consists of an anvil, in the center of which a 13-inch jarring machine with a 42 x 48 inch table, is placed. At one end of the anvil a 20-inch roll-over cylinder is mounted which carries a hinged frame, the arms of which are made to come down clear of the jarring table on either side of its shorter dimension. The arms carry the pattern plate which is centered on the table by dowel pins, and when the pattern plate has been lowered upon the jarring table, the arms of the hinged frame drop away from it, so there is no connection whatever between the jarring table and roll-over mechanism during the process of jar-ramming.

After the mold has been jar-rammed to the proper density and the bottom board clamped on the flask, pressure is admitted to the roll-over cylinder which brings the arms of the hinged frame up in contact with the pattern plate. During this movement the dowel pins in the hinged frame enter bushed holes in the pattern plate, thus doweling the pattern plate to the hinged frame before lifting the pattern plate off the dowel pins in the table of the jarring machine. This movement lifts the pattern plate with the flask off the dowel pins and clear of the table, continuing until the end of the vertical movement is reached and the roll-over movement begins. From this point the pattern plate is securely locked automatically, to the hinged frame, so that when rolled over, it remains suspended with the flask and bottom board clamped to it.

The hinged frame having passed the balancing point, the pressure is released from the roll-over cylinder and the mold is lowered upon the equalizing table, as

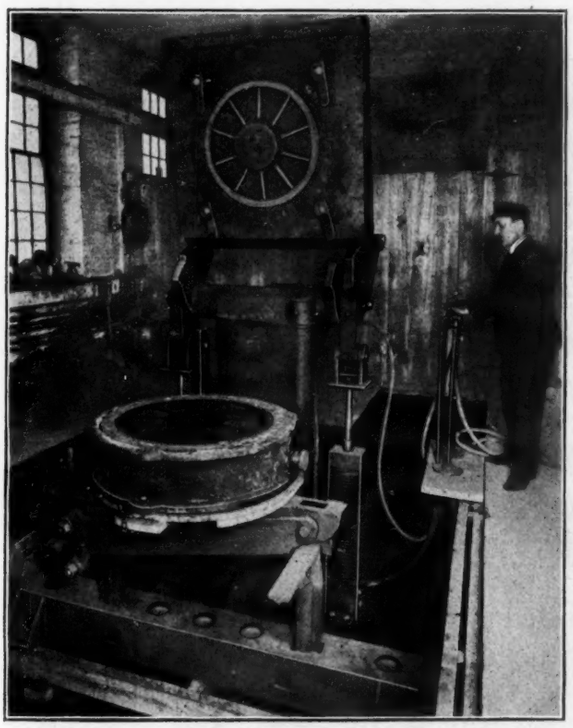


FIG. 1—PATTERN DRAWN AND HINGED FRAME SWUNG BACK

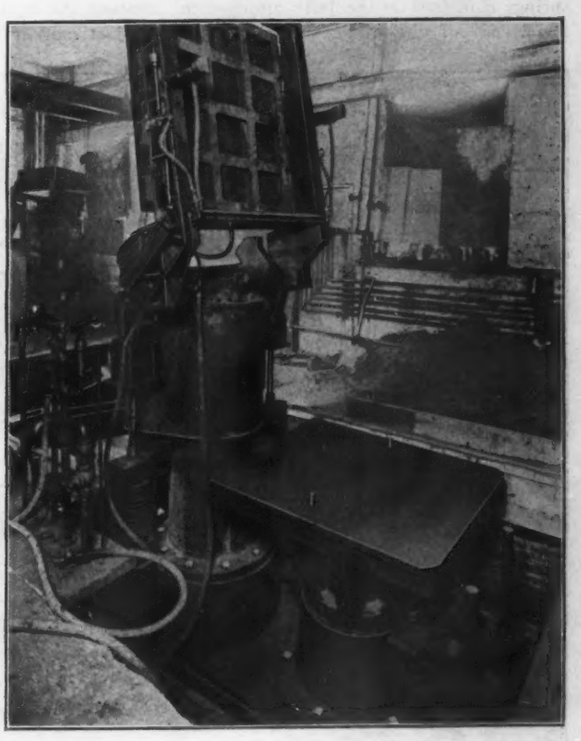


FIG. 2—JARRING END OF THE COMBINED JARRING AND HINGED MOLDING MACHINE

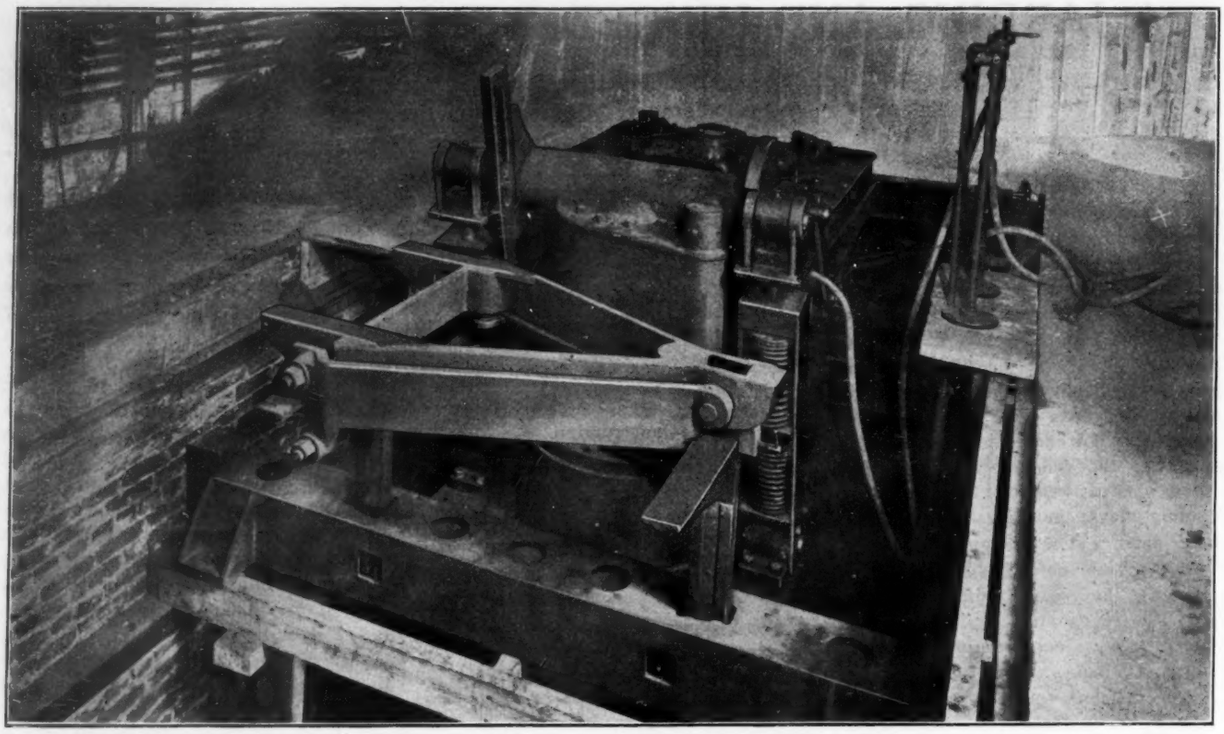


FIG. 3—PATTERN BOARD ON JARRING TABLE READY TO RECEIVE FLASK

shown in Fig. 4. In machines of this type the unbalanced weight of the piston, piston head and that portion of the hinged frame which contained the flask, is automatically balanced by compression springs contained in the links attached to the levers of the hinged frame, which assist in producing the roll-over movement and are located at each side of the roll-over cylinder. These counterbalance springs act shortly before the bottom board, which is clamped to the flask, reaches the equalizing table and take up all lost motion in the hinged frame and its actuating members, rendering them in a perfect state of balance, so that after the combined weight rests on the equalizing table, thereby setting the table positively, there will be no movement of the mold or pattern plate when the clamps are released.

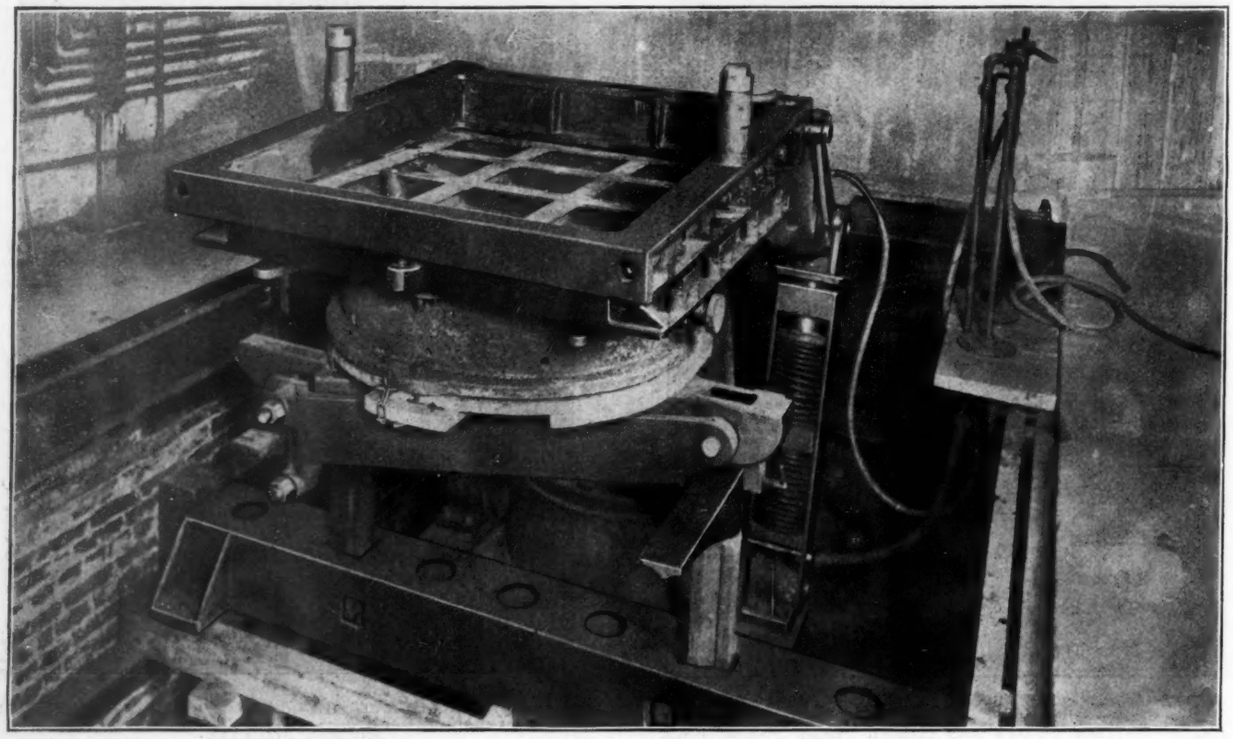


FIG. 4—FLASK ROLLED OVER WITH BOTTOM BOARD RESTING ON THE EQUALIZING TABLE

These machines are provided with a speed regulator which automatically increases the speed of the roll-over cylinder from the beginning to the end of the roll-over movement in both directions. This assures a rapid transfer of the mold from the jarring table to the equalizing table. The speed of the roll-over cylinder on the downward movement, in either direction, is choked gradually so as to be absolutely free from shock.

To secure the requisite strength and freedom from undue wear, and to assure a straight pattern draft, a large diameter cylinder, having an extra long bearing and operated in oil, has been provided, as well as ample means for taking up lost motion due to wear of the operating parts.

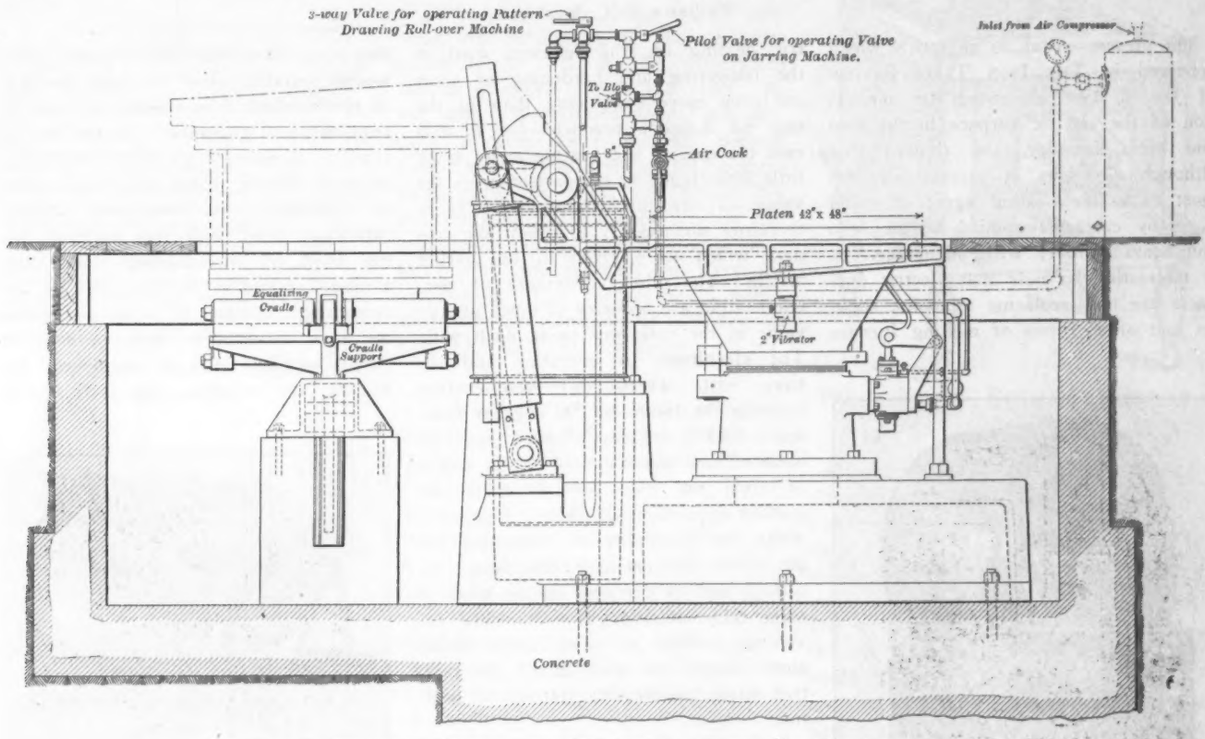


FIG. 5—SECTIONAL VIEW OF THE MACHINE IN BRICK AND CONCRETE PIT

Levelling Device.

The equalizing table is an automatic levelling device, by which the mold is set without reference to the pattern plate no matter how crooked the bottom board may be, and absolute stability is secured by supporting the bottom board on three points only. As soon as the weight of the mold comes upon the levelling cradle, it locks and holds it in a set position, while the pattern is drawn, as shown in Fig. 1. Here the pattern plate has been lifted out of the mold and is in the act of turning back to its position on the jarring machine as shown in Fig. 3.

When the weight of the mold is removed from the equalizing cradle it automatically adjusts itself to receive another flask. It is also provided with a vertical adjustment so as to care for the varying depths of flasks.

The device employed to lock the pattern plate to the hinged frame is provided with an automatic safety attachment to prevent the mold from being rolled over unless the pattern plate is securely locked to the hinged frame. During the return of the hinged frame to its position on the jarring machine, it is automatically unlocked from the pattern plate, so that when the latter settles on the dowel pins in the jarring table, the former is free to drop clear of the pattern plate to its proper position.

Eighteen inches of pattern draft has been provided, making the machine available for deep work of any kind suitable for jar-ramming. With this type of machine it is possible to draw a pattern having the least possible amount of draft, in fact, with the use of a vibrator it is possible to draw patterns of considerable depth without draft.

In conjunction with the operation of this machine there has been provided an arrangement for quickly locating the pattern in relation to the flask pins, assuring a perfect match when the two halves of the mold are closed. This arrangement facilitates a rapid changing from the pattern of one distinctive type to another.

All operations of the machine are controlled by three valves forming a stand conveniently located so as not to interfere with operating the machine. Formerly the jarring machine proper was made automatic in its action. This neccessitated the valve being actuated by the table, and as the valve must be opened before the table reached the end of its stroke, an air cushion resulted. To eliminate any possibility of an air cushion the valve is provided with a large exhaust port which remains at full opening during the full length of the downward stroke of the jarring table and until the next operation of the pilot valve. For convenience in counting the blows and to avoid the possibility of striking more blows than are desired, the main valve is operated in one direction by a pilot valve, and in the other direction automatically by the machine itself, for the purpose of limiting the strokes, which is made adjustable. The number of blows struck per minute is not so great as formerly but the ramming effect in a given time, is greater, because the cushioning effect of the automatic valve has been entirely avoided.

Method of Operation.

When making a mold the flask is set on the table in its proper position and clamped to the pattern plate. The sand frame is then placed on the flask which is filled with sand. The sand frame is a temporary extension of the flask which carries the excess loose sand necessary to fill the flask as it becomes compact by jarring. By means of a pilot valve a

blow is struck for every depression of a hand lever and the number of blows can thus be accurately counted as found by experience is necessary for the quality of sand.

After the operation of jarring has been completed the sand frame is removed, the excess sand struck off and the bottom board clamped to the flask. Pressure is admitted to the roll-over cylinder by means of a three-way, air valve, which brings the arms of the hinged frame up in contact with the pattern plate.

After the hinged frame has passed the balancing point the pressure is released by the operator from the roll-over cylinder, allowing the hinged frame to descend to an inverted horizontal position, lowering itself in a straight line until the bottom board and suspended weight rest upon the equalizing table. The clamps are released from the flask, the vibrator started and at the same time air is slowly admitted to the roll-over cylinder until the pattern is drawn clear of the mold, when the valve is opened wide and the hinged frame rolls back to its original position. After "blowing off" the pattern plate and pattern with a blow valve provided for the purpose, the machine is ready to receive another flask.

The machine is built by the Tabor Mfg. Co., Philadelphia.

ELECTRIC ANNEALING FURNACES FOR HARDENING AND TEMPERING HIGH CLASS TOOLS

By John B. C. Kershaw.[1]

The present writer, in an article which appeared in The Iron Trade Review of Jan. 2, 1908, discussed the application of the electric furnace in the iron and brass foundry, and showed that although electricity at present was the most expensive heating agent—it could in many cases be applied in the iron and brass foundry with advantage. It is interesting to note that electric furnaces are now replacing crucibles, cupolas and other forms of melting furnace

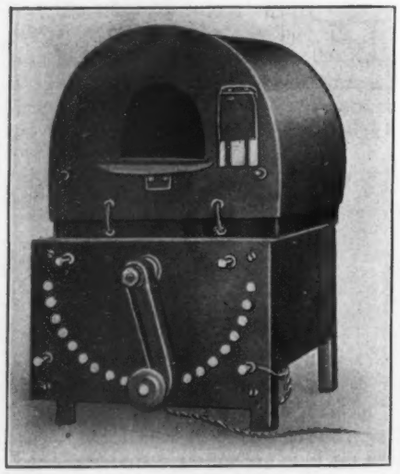


Fig. 1—Heraeus Platinum Resistance Furnace.

in many of the European steel works, and that the change from coke, or gas-fired crucibles and furnaces, to electric furnaces, is said to be allied with improved metal and increased economy. An example of this kind is that of the Bonner Fraser Fabrik at Bonn, Germany, where a large Stassano electric furnace has replaced a battery of crucibles—for the preparation of the metal required in light castings.

The arguments for the use of electric heating for the furnaces used in the tempering and hardening of tools are even more convincing than in the case of foundry practice,—for in this case the cost of the heating agent is of little importance in comparison with the value of the finished product. It is therefore unnecessary to repeat the cost data which were given in the earlier article. The other advantages of electric heating are however of much greater value in the case now being dealt with. The cleanliness of operation and the ease with which any temperature between the limits of 500 degrees Cent. and 1,400 degrees Cent. can be obtained and maintained for any length of time are two of the most important advantages of electric heating,—while the possibility of excluding the air from the chamber containing the articles and of carrying on the work in some non-oxidizing gas is a minor advantage, which in some cases would alone decide the question of the relative merits of the two systems of heating.

It is not contended that the method is suitable for the large pieces of work, such as armor plates and gun casements, which are now face-hardened by special heat treatment,—but for tempering, hardening and annealing the smaller pieces of work there is no doubt whatever that the use of electricity as heating agent offers greater advantages, and that in time the electric annealing and hardening furnaces will be found in all up-to-date works, manufacturing knives, scissors, springs and similar articles.

Three types of furnace are at present manufactured and are in use for this particular class of work. All are of the resistance type—since the heat produced by the electric arc is too high and too variable to be successfully employed for this purpose. In furnaces of the first type platinum gauze or foil is employed as the resistance medium, long strips of narrow foil or gauze being wound spirally round the tube crucible or muffle which is to contain the articles requiring heat treatment. In the second type of furnace, a patented resistance material known under the trade name of *"Kryptol"* is employed, capped cartridges filled with this material being used as the heating units, and arranged round or in the walls of the containing chamber or vessel. Finally, we have furnaces in which a bath of fused metallic salts is employed for heating the articles, this bath being

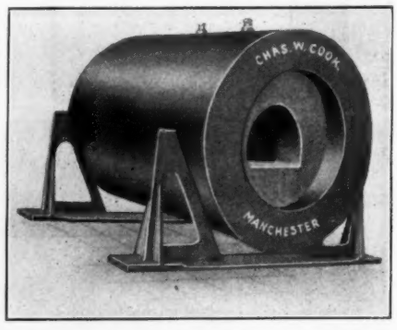


Fig. 2—Cook Platinum Resistance Furnace.

kept in the molten state by means of an electric current. It is important in this case that alternating current alone should be employed, otherwise electrolytic action may occur, and the metal salt be decomposed into its elements.

With all three types of furnace it is necessary to employ some accurate form of pyrometer for measuring the temperature of the furnace. One of the recording forms of these is most suitable, since the personal attendance required is then reduced to a minimum. The regulation of the temperature is of course obtained by varying the strength or intensity of the current, —and other conditions being the same, the temperature will increase with the

[1]West Lancashire Laboratory, Waterloo, Liverpool.

number of amperes flowing through the resistance. A reliable tube or wire resistance frame or a small water resistance will therefore be a necessary adjunct of the electric annealing furnace for obtaining the necessary variation in the current strength.

Examples of the three types of furnace will now be described and illustrated.

Platinum Resistance Furnaces.

The electric current can be employed for temperatures up to 1,500 degrees Cent., with platinum as the resistance material, but the earlier method

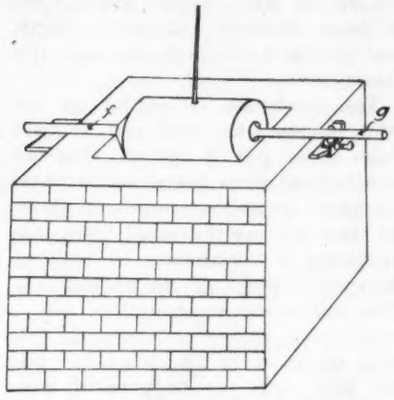


FIG. 3—SCHOOP KRYPTOL RESISTANCE FURNACE OPEN.

of constructing these furnaces—by winding thin platinum wire upon a porcelain tube—was found unsatisfactory, and tube furnaces of this type are now made with platinum foil. The experimental work carried out by Heraeus has proved that foil 0.07 millimeter thick, weighing 15 grains per square decimeter, is the most suitable for this purpose.* This foil is employed in long narrow strips and is wound upon the tube so that only two or three millimeters of uncovered space, remains between each coil of the spiral. The contact between the platinum spiral and the tube is thus rendered very intimate, and the temperature of the foil is but little higher than that of the porcelain upon which it rests;—whereas with platinum wire the difference in temperature is often extremely large. A further advantage is, that the weight of platinum required is reduced to one-sixth. A tube furnace of this type—with a tube 25 millimeters in diameter can be heated up to 1,400 degrees Cent. in five minutes. This method of construction however can only be employed for round vessels, and for other shapes, such as muffle furnaces. Heraeus makes use of fine platinum gauze, which is firmly fixed in or upon the wall of the furnace by a glaze. The spirals of platinum gauze can in this way be embedded in the dome and back wall of a muffle, and uniform heating be obtained without any risk of fracture. By use of a non-conducting covering such as an enclosed air space, the radiation losses with this type of furnace can also be reduced to a minimum, and electricity at six cents per kilowatt be made equivalent in heating value, to gas at three cents per cubic meter, while the temperature range is 200 degrees Cent. higher. Fig. 1 shows a muffle furnace of this type (made by Heraeus) with the resistance box enclosed in the base, the range of temperature of this furnace and resistance being 700 degrees to 1,200 degrees Cent. The furnace is provided with a gold wire safety device which prevents over-heating of the platinum wire gauze spirals. It can be constructed for all pressures up to 250 volts. At 110 volts, a five-ampere current will produce a temperature of 800 degrees Cent. and 10 amperes 1,200 degrees Cent.; while on a 220-volt circuit, 2½ amperes and five amperes produce the same temperatures. Fig. 2 shows a similar muffle furnace made by Cook of Manchester. This furnace has a 4-inch flat bottom and consumes at 1,200 degrees Cent. one B. T. U. per hour.

Kryptol Furnaces.

"Kryptol" is a patented resistance material, of graphite, coke and carborundum, the chief feature of the mixture being that the grains are all of uniform size, and that they possess rounded corners and edges. There are 30 varieties of the kryptol mixture manufactured, the largest having grains of 7 millimeters diameter; and the relative proportion of the three components being varied to suit the pressure of the current supply which is to be used. The addition of graphite increases the electrical conductivity of the mass, that of coke and carborundum diminishes it. Two classes of heating apparatus

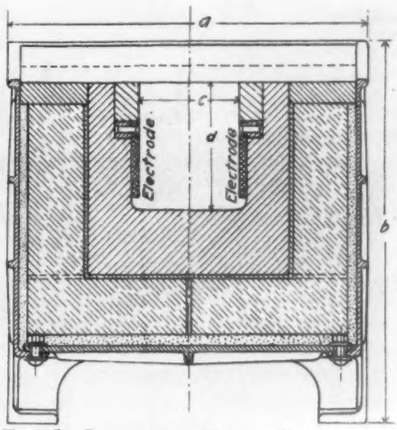


FIG. 5—SECTION OF FUSED SALT RESISTANCE FURNACE.

are manufactured with this resistance material. In the one class the *kryptol* is employed without enclosure, and it thus comes into contact with the air and with the vessel or articles being heated,—in the other class the *kryptol* is enclosed in air-tight glass tubes with metal caps. The latter method of employing this resistance material has many points in its favor—the kryptol is protected from the action of the air—and the temperature is more easily controlled and regulated. The tubes or cartridges of kryptol (15 to 20 millimeters diameter and 200 to 500

FIG. 4—KRYPTOL RESISTANCE FURNACE CLOSED.

millimeters long) are held by spring clamps in a specially designed frame, and are connected in parallel to the current leads, such a frame holding 20 cartridges, and being suited for use with either direct or alternating current at 110 or 220 volts. The temperatures attainable with these cartridges are necessarily limited however by the glass covering (glass melts at 1,200 degrees Cent.) and for temperatures above 800 degrees Cent. the kryptol must be used in the unprotected state. Fig. 3 shows a furnace of this kind designed by Schoop and Fig. 4 a muffle furnace manufactured by the Kryptol Gesellschaft of Berlin. In Schoop's furnace, the kryptol is placed loosely in the cavity which holds the actual heating cylinder, and the current connections are made by coppered carbon electrodes, embedded in the brickwork, at each end of the cavity. The cylinder rests upon the kryptol and is provided with open tubes running parallel with its axis at each end, also with a thermometer or pyrometer for controlling the temperature. This form of furnace was used by Schoop for experiments upon the roasting of ores in various gases but with the addition of some protected device against loss of heat, and also of a charging opening, it could be em-

ployed for hardening and tempering work. It must be noted however that when kryptol is employed in this way for production of high temperatures slow combustion of the material with evolution of carbonic oxide gas always occurs, and this type of furnace must therefore be provided with a draft-hood for leading away the noxious gases. The muffle furnace shown in Fig 4, on the other hand, is free from this disadvantage as the *kryptol* is here enclosed. The writer has no data showing the temperatures attainable with or current consumption of these furnaces, but for low temperature work they are no doubt convenient and economical.

The Fused Metallic Salts Hardening Furnace.

The use of baths of fused metals (such as lead) or of fused metallic salts, for hardening purposes is not new in the steel tool industry, and the only feature of the bath about to be described which is novel, is the employment of an electric current for keeping the bath in the molten condition. With gas—or coke—heated baths of this kind, it is very difficult to keep the whole mass of molten metal or salt at one temperature, and the heating being external the containing vessel is quickly eaten through. By means of electric heating with terminal electrodes of large superficial area, the temperature of the bath can be kept uniform and all danger of unequal heating of the steel be avoided; and as a result of the method of construction, the life of the containing vessel is indefinitely prolonged. Fig. 5 shows a sectional elevation of such an electrically heated metallic salt bath. A cast iron containing vessel, is first lined thickly with fire-clay—and is then bedded with fire-clay bricks. The cavity is next lined with asbestos, and in this is placed the vessel made without joints for holding the fused salt,—the whole forming a compact mass—as shown in the illustration. The choice of material for the crucible depends upon the salts used, a well-baked refractory clay being the most suitable. Two sheets of soft iron form the electrodes, and are supported by the crucible walls, the connection with the main current leads being made by transverse bars of rolled iron, placed one upon each side of the crucible cavity. A transformer is required, which will yield current at pressures ranging from 5 up to 55 volts, the latter voltage being required when starting up the bath with all cold. For this purpose an iron rod is placed between the two electrodes, and the connection between this rod and the latter is made by small pieces of arc-lamp carbons. The secondary circuit formed in this way, gradually melts the metallic salts lying around the carbon pieces—and in time by manipulation of the iron rod, the whole upper surface of the bath is molten and is able to carry the current. The secondary electrode is then removed and the heating effect of the current, which is carried by the upper layer of molten salt, is found to gradually extend, until the whole of the bath is melted, and a uniform temperature (which varies with the current strength) is attained. To some extent the limits of temperature are regulated by the composition of the bath, and by the choice of certain salt mixtures a fairly high temperature can be attained. It is important in the case of this type of furnace, to employ only alternating current for the reasons already named.

The issue of THE IRON TRADE REVIEW for Dec. 10, 1908, contains an illustrated description of An Electric Annealing Furnace of this type made by the General Electric Co. of Schenectady.

A MOTOR DRIVEN ROLL LATHE.

The Geo. A. Hogg Iron & Steel Foundry Co., Pittsburg, has just completed, for the Donora Works of the American Steel & Wire Co., one of its new improved roll lathes. This lathe, which is of the latest design, was built expressly to suit the requirements of rolling mills where quick, accurate and perfectly true work and convenience of manipulation are necessary.

It is particularly designed for necking chilled rolls, and will produce a perfectly smooth, true neck on the headstock end, thus obviating the necessity of reversing the roll on the centers.

The lathe has the main headstock casting in a single piece, which, with the extra heavy steel center spindle drawn into a taper socket by a steel key, prevents any lift or spring in the headstock center.

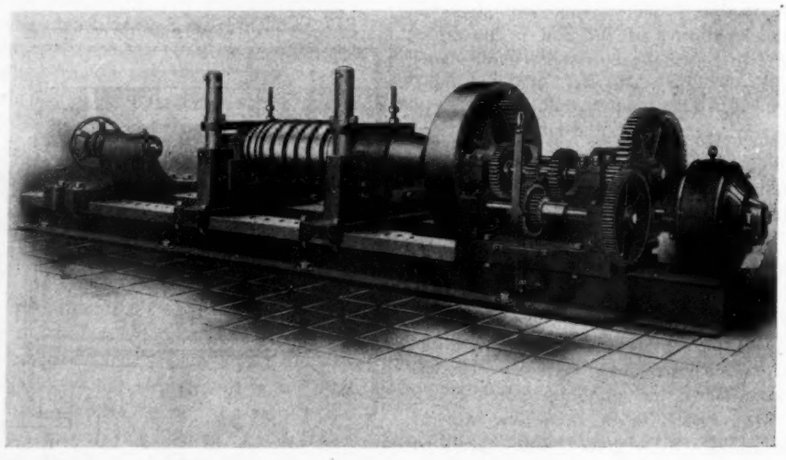
The gearing is machine cut, of heavy pitch and broad face. The face plate is a solid plate wheel with an internal gear cast solid to the wheel, thus reducing the liability of breakage or chatter to a minimum. The pinion for driving the face plate is of steel, and is placed on the front of lathe so as to bring the power as near the work as possible and as the journal is on the side, there is no lift on the caps. All the journals are of large diameter and ample length, and provision is made for complete lubrication.

The headstock is central on the bed, so that the lathe can be used from either side, if desired. The bed is broad and extra heavy, and is ribbed its whole length underneath the shears to allow the use of hooked bolts, thus rendering it unnecessary to back up back of the bolts on the necking rest. The tail stock is on rollers and is very broad, extending across the bed with the bolts on the outside, so that the bolts need not be removed when setting the lathe.

The housings are strongly constructed and have round posts and short caps. They are fitted with piano rests and have bearings back of the center of the necks and adjusting screws for taking up side wear.

There is a simple topping rigging which can be quickly adjusted or removed, and also an arrangement for crossing the rolls in topping. The cap bolts can be removed and the roll changed without disturbing any other parts. All bolts are through bolts, and if broken can be replaced at any time without trouble.

All of the details have been de-



THE HOGG ROLLING TURNING LATHE.

signed to permit the heaviest cuts on a chilled roll, and at the same time to have the lathe as convenient as possible without the sacrifice of rigidity. The lathe is direct-connected to its driving motor, cut gearing being the transmission medium. The motor is placed on its own bed plate at the rear of the headstock, thus preventing the transmission of any jar from the motor to the headstock, as is the case where motor is mounted on the top of headstock. There are three changes of speed possible by means of gears, the change of speed being effected by throwing over the lever shown on back of the headstock, thus permitting the use of a constant speed motor. A variable speed motor can be used, if desired. To get a greater range of speeds the lathe is furnished in five sizes, 60 inch, 55 inch, 38 inch, 24 inch and 16 inch, suitable for turning the largest and smallest sized rolls.

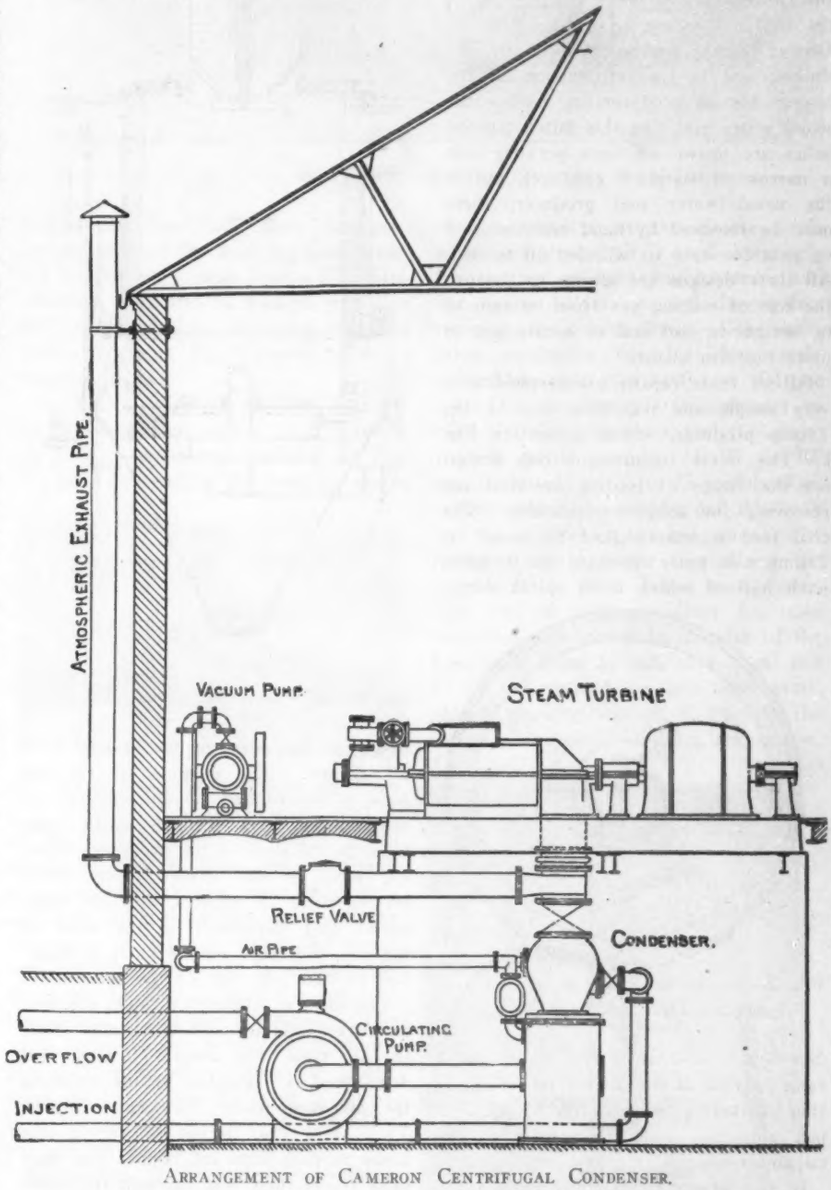
A CENTRIFUGAL JET CONDENSER.

The accompanying illustration shows a Cameron centrifugal jet condenser arranged to operate in connection with a steam turbine. This arrangement is patented and was designed to overcome certain difficulties found in other designs of jet condenser sets. The condenser cone is mounted on a tank or hot well and is placed on the basement floor underneath the turbine and directly in line with the turbine exhaust opening. As the cooling water flows to the condenser spray nozzle under suction due to the vacuum, it is essential that the injection water opening be located *not* more than 20 feet above the surface of the water supply. The incoming steam meets the water spray and mingling with it, is condensed and falls into the hot well, from which it is pumped out by a centrifugal pump. The air and non-condensible vapors are removed by a dry vacuum pump conveniently located.

In an apparatus of this kind the cooling water must not flow into the condenser faster than the centrifugal pump can remove it, or the condenser will flood. On the other hand, the centrifugal pump should not pump out the condenser faster than the cooling water enters, for if it does, it will be pumping a mixture of water and air and is liable to accumulate air in its impeller and become air bound; in other words, lose its suction and destroy the vacuum.

To overcome this difficulty there is provided a hot well and the centrifugal pump suction pipe is submerged by carrying it down inside the hot well to the bottom. The water level in the hot well, under normal operating conditions, is carried at about the center of the centrifugal pump. Should the quantity of cooling water be increased, the water level in the hot well will rise and result in an increased head on the centrifugal pump suction and cause the water to flow faster to the centrifugal pump. A decrease in the quantity of cooling water lowers the level and checks the quantity flowing. The centrifugal pump is therefore self-regulating, having an increased capacity as the water level in the hot well rises, and a decreased capacity as it falls. The hot well provides such storage capacity that these fluctuations in level are in no way violent. A rise and fall of one foot is all that usually occurs. With a 28-inch vacuum in the condenser, the water level in the hot well cannot become so low as to uncover the end of the suction pipe and allow air to get to the centrifugal pump.

The injection spray is regulated by a hand-wheel on the side of the cone, and can be quickly flushed if it becomes clogged. A vacuum breaker is provided to prevent the condenser from flooding in case of accidental stopping of the centrifugal pump. This style of condenser is suitable for units from 300 to 8,000-kilowatt capacity. It is built by the A. S. Cameron Steam Pump Works, New York City.



Arrangement of Cameron Centrifugal Condenser.

The Lucas Machine Co., Jamestown, N. Y., to manufacture machinery, with $5,000 capital stock, has these incorporators: Louis Lucas, Oscar R. Pang, Frank G. Curtis, Don Allen Curtis, Jamestown, N. Y.

THE TRUMP CONTINUOUS GAS PRODUCER.

The development of the gas producer has been in the direction of increasing the amount of coal gasified per unit of producing capacity and the reduction of the labor required in operating. This has been accomplished by the adoption of mechanical poking or stirring of the fuel bed, as in the Hughes producer, the continuous and even distribution of the coal in feeding, as in the Bildt or George feed in use on the Morgan producers, and in the introduction of the hopper bottom producers to replace the usual water seal. In this latter type the ashes are drawn off once per day into a narrow or standard gage car, but in the usual water seal producer, these must be removed by hand and shoveled on to a conveyor or wheeled on to cars. All these designs are efforts to cheapen the cost of making gas from bituminous or anthracite coal and to secure gas of more uniform quality.

All of these results are secured in a very simple and ingenious way by the Trump producer, shown in section Fig. 1. The novel features of this design are the means of feeding the coal and removing the ashes continuously. The coal feed is accomplished by using the Trump ash knife mounted on a table, each half of which is of spiral shape.

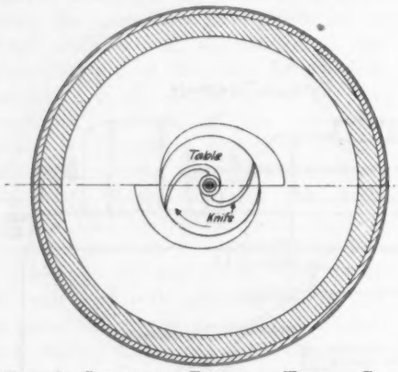


FIG. 2—SECTIONAL PLAN OF TRUMP GAS PRODUCER THROUGH FEED TABLE.

See Fig. 2. The knife and water cooled table revolve at different rates of speed, thus delivering the coal on to the fuel bed uniformly from the center to the circumference.

In this design the feeding knife is of sufficient depth and strength to prevent any clogging of the feed in case a large lump finds its way into the hopper.

The ash removal is accomplished by a revolving deflector or Trump knife, so designed as to give a radial thrust to the ashes, as shown in Fig. 3. In operation the table is stationary and the knife is slowly revolved, cutting a section of the ashes out from under the fire, and dropping the whole bed of fuel and ashes in pie-shaped segments on to the table, thus repeatedly shearing the fire bed vertically and preventing the formation of masses of coke.

The fuel is fed continuously and the ash knife may be run continuously at a slow speed or 20 or 40 minutes each

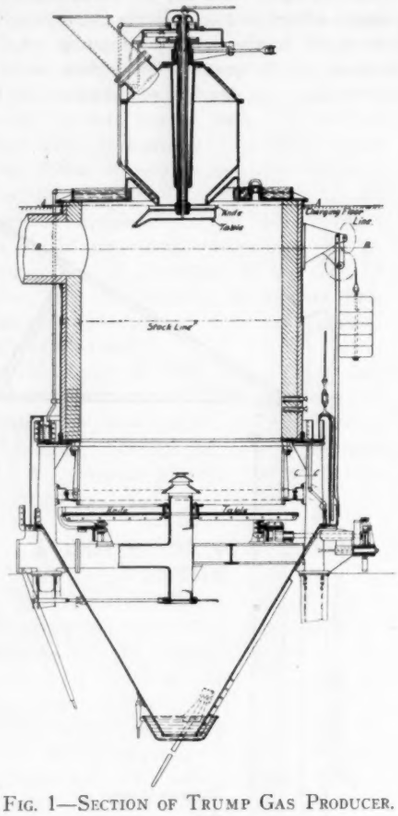


FIG. 1—SECTION OF TRUMP GAS PRODUCER.

hour. In this way the bed is kept level all around. The position of the fire zone is determined by introducing ½-inch round bars through small poke holes in the shell of the producers about the level of the center tuyere. After leaving them 15 minutes, they are withdrawn and, dependent on the color of the rod, the speed of the knife is modified to take out less or more ashes.

The blast is admitted through the center tuyere and through the grates above the ash table. The amount of blast thus distributed is regulated by the valve in the air pipe under the center tuyere. This valve also serves to permit any ashes to drop into the hopper that may have found their way through the openings in the center tuyere.

Access to ash knife and table is easily obtained by lifting the water sealed shell, which is accomplished by a hand wheel at one point which one man can operate easily. The ashes are removed once each 24 hours by dumping the water sealed pan at the bottom of the conical hopper, the discharge being made into standard or narrow gage ash cars.

A 10-foot producer of the Trump design will gasify 35 tons per day of non-coking bituminous coal, nut size, and 30 tons per day of nut and pea coal mixed. With fine anthracite, the greatest diameter in use is 7 feet and the producers will gasify 7 tons of such coal in 24 hours.

When the gas is used hot for metallurgical purposes, the calorific efficiency of the producer plant would be 85 per cent and if the gas is cooled to 75 or 80 degrees Fahr., the efficiency would be about 80 per cent. The high efficiency is due to continuous coal feed and removal of the ashes, which is clearly demonstrated by the analysis of the ashes, which for long periods show only 3.5 per cent carbon, and to the eye appear red or white, dependent upon the kind of coal in use.

The continuous operation of the producer with continuous feed and discharge, gives a very uniform quality of gas, especially adapted to gas engine use, increases the amount of ammonia in recovery plants, and gives maximum capacity with coking coals, largely removing the trouble of hand poking.

The power required has been accurately determined and found to be as the knife is usually run, one revolution in six hours, as considerably less than

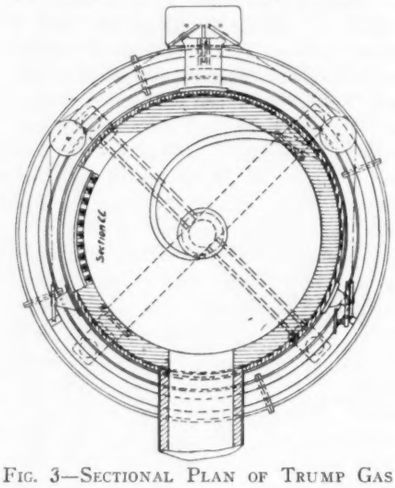


FIG. 3—SECTIONAL PLAN OF TRUMP GAS PRODUCER THROUGH ASH DISCHARGE TABLE.

one horsepower, and about double that amount to start.

As to the cost of operation for a plant of eight 10-foot producers which could safely handle, that is, gasify 200 tons of bituminous coal per day of 24 hours, one man would be required on top on each turn and one below. These, with a foreman, would constitute the whole force necessary to operate the plant.

The producers were invented by Edwin N. Trump, M. E., of Syracuse, N. Y., and are now being put on the market by Ladd & Baker, Inc, Real Estate Trust building, Philadelphia, Pa., who are prepared to contract for any size of installation required.

THE PAHLOW PATENT HOSE COUPLINGS AND VALVES.

The accompanying illustrations show features of a new hose coupling and valves, which are the invention of Frank C. Pahlow, superintendent of the Ecorse yards of the Great Lakes Engineering Works, Detroit. The coupling allows a full area through the hose and presents no obstruction against which particles of water may lodge and freeze in cold weather and thus choke up the hose with ice. It permits a reduction in the size of hose used to carry a given quantity of air or water, inasmuch as the coupling does not decrease the area offered for passage of the fluid, as is usually the case. This

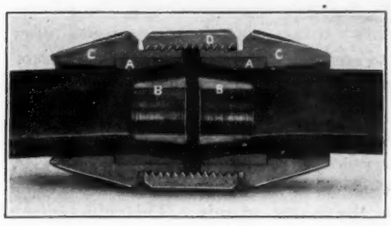


FIG. 1—SECTION OF THE PAHLOW HOSE COUPLING.

effects a considerable saving in the cost of hose necessary to equip a given plant, as a smaller diameter hose may be used for a given service.

The coupling is also so designed that there can be no leakage of air or water through it, thus increasing the efficiency of pneumatic and hydraulic plants and enabling the use of low pressure at the central station. The illustration, Fig. 1, is a section through the coupling and shows clearly its construction. The tapered ring A is slipped over the end of the hose and a tapered thimble B inserted on the inside, the two being forced together with the hose projecting slightly beyond. The tapered ring C fits inside of the recess on the coupling nut C, allowing it to turn freely. The two coupling nuts C are connected then by means of a threaded sleeve D. Turning the nuts C which are free to move

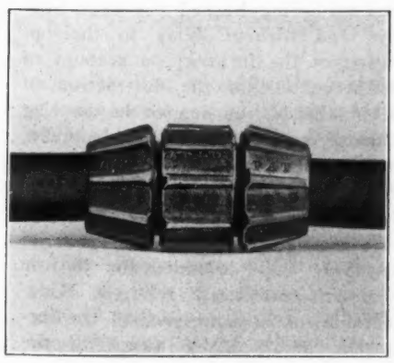
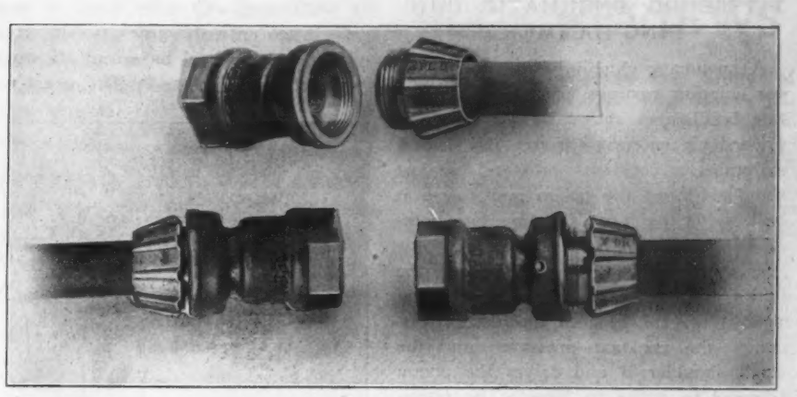


FIG. 2—THE PAHLOW HOSE COUPLING CONNECTED.



FIGS. 3-5—VALVE USED IN CONNECTION WITH PAHLOW HOSE COUPLING.

around the hose will draw the projecting ends of the hose together, making an absolutely tight joint. This construction eliminates all gaskets, and also the use of wire for fastening the hose to the coupling. Fig. 2 shows the coupling made up.

In Fig. 3 is shown a valve operated by the valve nut, which, when screwed up, unseats the valve admitting air into the hose and sealing the joint by means

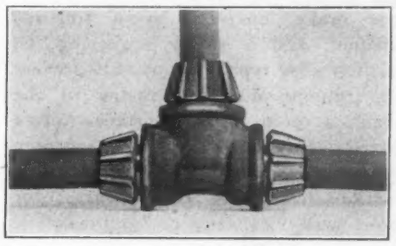


FIG. 6—PAHLOW HOSE COUPLING USED WITH TEE-CONNECTION.

of the projecting end of the hose, as shown in Fig. 4. The valve nut and the coupling nut are exact duplicates and may be used either for operating the valve and for forming the coupling. If the valve nut is slacked off, as shown in Fig. 5, the valve becomes seated and closes the air supply. The valve body contains a relief hole shown in Fig. 5, which allows the air to escape from the hose after the valve is seated. It is unnecessary to unscrew the valve nut entirely to shut off the air.

Adaptations of this coupling comprise a reducing coupling for the connecting of different sizes of hose together, a tee coupling shown in Fig. 6, and used in riveting work, where an operator may use alternately a riveting and a chipping hammer. The coupling nut on the main hose is connected to the tee and also two shorter lengths, to the one of which is attached the riveting hammer and to the other the chipping hammer. Fig. 7 shows a manifold connection, as used in the Ecorse yards of the Great Lakes Engineering Works.

Practical results attained with the use of this coupling at the Ecorse yards where compressed air is used extensively for riveting and chipping hammers and for drills, holders-on and forge fires comprise the cutting down of the operating machinery for furnishing compressed air from two 3,000-foot and one 2,000-foot capacity air compressors to two 3,000-foot machines and the maintenance of a pressure of 90 to 100 pounds instead of 60 to 75 pounds. This is due entirely to cutting out the leaks in the valves and couplings. The increased air pressure also allows the operators to work better and faster. The use of these couplings has also permitted a reduction in the size of the hose used from ¾-inch to ½-inch, due to the full area of the hose being available in the coupling. F. C. Pahlow, the inventor, is located at 278 Clark avenue, Detroit.

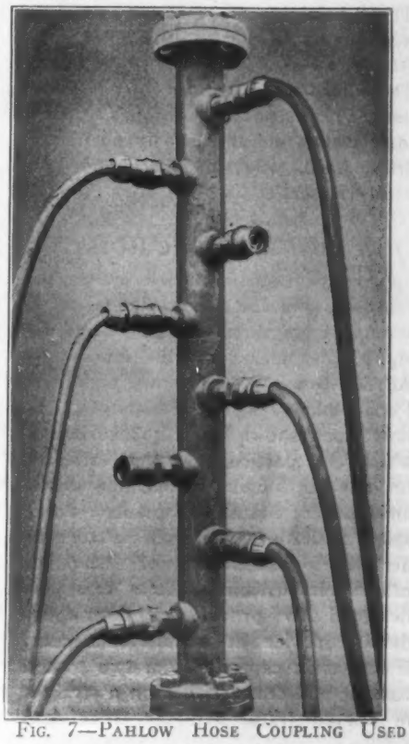
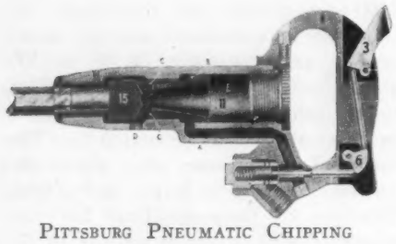


FIG. 7—PAHLOW HOSE COUPLING USED ON MANIFOLD.

PITTSBURG PNEUMATIC CHIPPING HAMMER.

A pneumatic chipping hammer adapted for chipping castings, plates, calking and flue beading, is shown herewith. Compressed air entering through the port A maintains a constant pressure against shoulder B on the piston and forces it back until the ports C come into communication with the feed port A. Air then enters the cylinder E through the hollow portion of the piston, and acting against the full area of the piston overcomes the constant pressure on the small shoulder B and drives the piston forward to strike its blow. The piston port C coming into communication with the exhaust chamber D in the cylinder, permits the pressure back of the piston to escape, when the constant pressure on the piston shoulder again moves the piston back as previously stated. Blows are thus repeated in rapid succession. Vibration is reduced to the minimum by

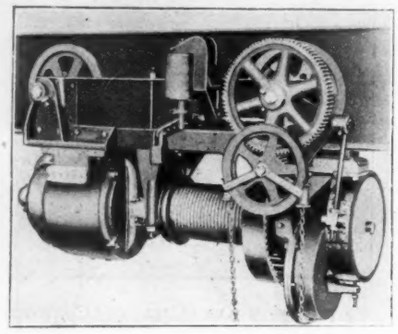


PITTSBURG PNEUMATIC CHIPPING HAMMER

the air cushion formed by the pressure admitted through the hollow portion of the piston against which it is returned. These hammers are made in six sizes weighing from 4½ to 10 pounds, with strokes ranging from ½ to 4 inches. These hammers are made by the Pittsburg Pneumatic Co., Canton, O., which also makes a full line of pneumatic drills, hand, yoke, stationary and pedestal riveters.

A NEW ELECTRIC HOIST.

A line of small electric hoists for traveling on the lower flange of I-beams or on monorails has been designed and placed on the market by Alfred Box & Co., crane builders, Philadelphia. The accompanying illustrations shows one of these hoists, which is particularly well adapted for use in foundries, machine shops and other industrial plants where space limitations are such as to render the installation of traveling cranes impossible. This hoist is designed to provide a thoroughly durable device at a minimum cost; it ranges in capacity from two to ten tons, it will travel either on a straight or curved track, and the travel can be performed either by hand or power. The entire frame is of steel, with a large wheel base and all working parts are enclosed. The gears are



ELECTRIC HOIST

all of the spur and internal type and are cut from solid steel blanks at the Box works. The hoisting drum is grooved to take the full run of the wire hoisting cable, so that there cannot be any overlapping of the rope, which is one of the common sources of wear. A limit switch is provided to prevent the overwinding of the hoisting drum, and an electric brake, operated by a solenoid magnet, and a safety brake of the friction disc type are in place to prevent the running down or racing of the load, a point of importance often overlooked. The small headroom required is evident from the illustration, which is of a two-motor hoist with a capacity of 7½ tons.

THE BLAIR PORT AND BULKHEAD FOR OPEN-HEARTH FURNACES.

The accompanying illustrations show features of the Blair patented port and bulkhead for open-hearth furnaces. The whole end-blocks, including ports and down-takes, are built of ground magnesite, with 15 per cent of ground basic slag, and enough coal tar to make it pack well, all materials being rammed in. The gas port arch in this construction is replaced by a water-cooled boiler plate hood which rests 12 inches on each side of the port on the magnesite bank and covers the entire port. It has an insulation of ground magnesite on its upper side, so that all seams in the hood are protected from contact with the flame. The hood is carried forward over the port to a point from 3 to 5 feet from the block, thus forming a mixing chamber for the gas and air before they enter the combustion chamber proper over the hearth.

The end blocks may be built of silica and brick in an acid open-hearth furnace, the main feature of this construction being the water-cooled hood which replaces the brick arch.

The bulkhead consists of a plate with splash pans, or a plate box similar to the hood and cooled by the water overflow from the port hood. This bulkhead forms that portion of the back wall of the gas port, which burns out rapidly. It may be insulated from direct contact with the gases by a brick wall on its inner side in the same manner that the loose ground magnesite is used on the upper side of the port hood.

No additional water is required in this construction, as the cooling water, after leaving the port, passes through the bulkheads and ovens to the valves. This cooling water need not be under any pressure other than the ordinary low service water supply.

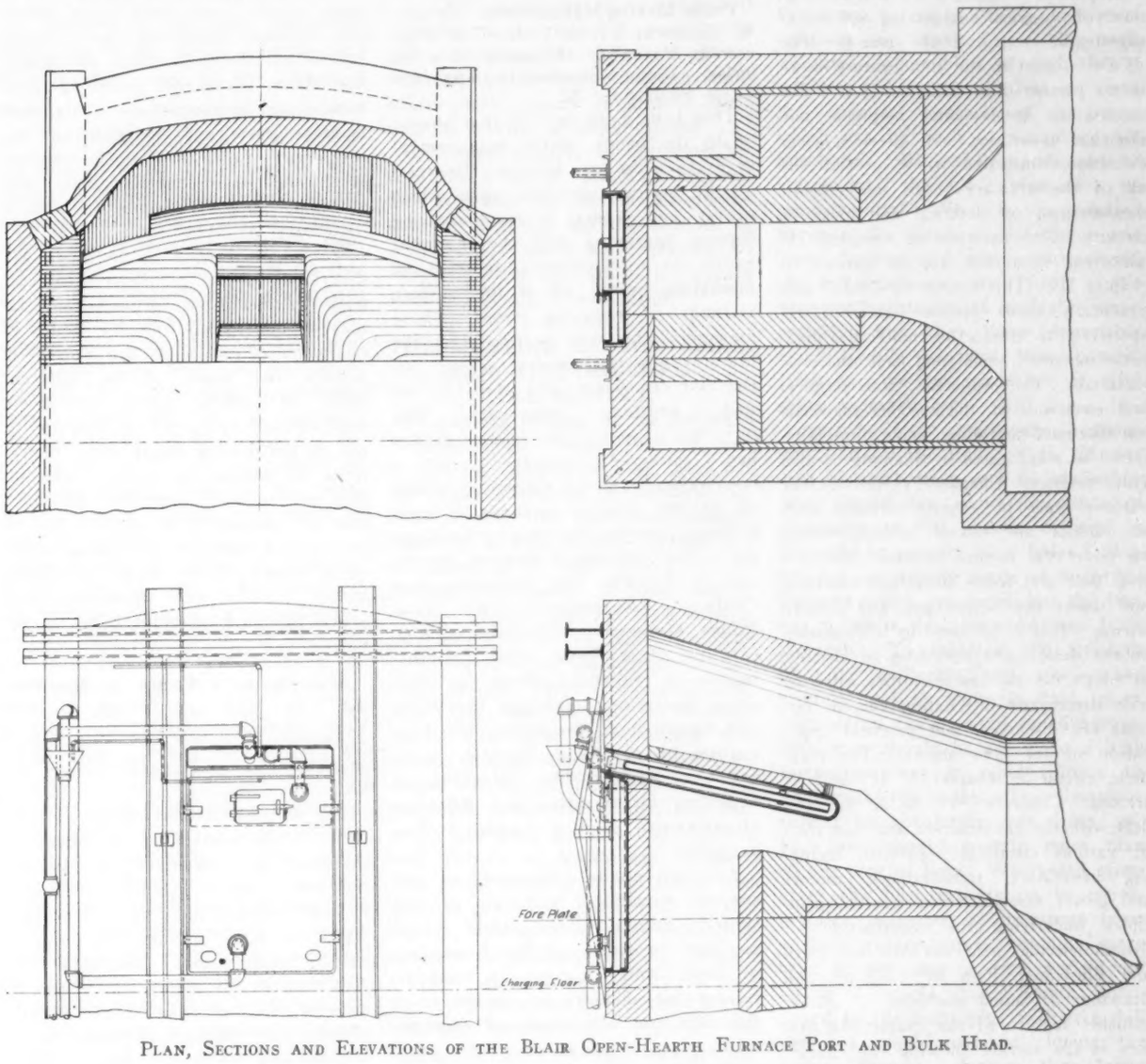
A small connection is made to the hydraulic system to afford protection against injury to the bulkhead or hood, due to accidental interruptions to the water supply. This connection is also used for a few minutes daily to change the circulation of water and to wash out any sand deposit or mud that may have accumulated where it is necessary to use abnormally dirty water.

The advantages claimed for this port and bulk-head comprise: A practically indestructible port, which gives complete control of the combustion and direction of the gas at all times, the ports being always in perfect shape. The other parts of the furnaces are given a much longer life than with the ordinary brick port, and in case of the roof and side walls, much more than double the life, thus cutting down the repairs to the furnace and effecting a large saving in maintenance; it is unnecessary to rebuild roof and side wall, because of general repairs being caused by the burning down of the ports; either roof or sidewalls can be replaced when they are worn out, when the furnace flues are being burned out over Sundays and without delay to the operation of the furnace; on account of the prevention of the destruction of the bulkheads, the deposit in the slag pockets is reduced to a minimum, and the life of the checkers increased; there being no silica brick in the end of the furnace to melt down and flux the magnesite bottom, the cost of magnesite and dolomite for bottom repairs is materially reduced. Considerable increase in speed of the furnace is obtained, by means of the mixing chamber, which makes a high-

er temperature available, and the furnace can be run hotter, because this construction of port withstands a temperature on the outgoing end, which would destroy the ordinary brick port. The saving in operation comprises no repair of bulkheads, ports or blocks, and at least one-half of the repairs on all other parts of the furnace; a saving in up-keep of bottom, and a reduced fuel consumption per ton, a uniformly increased tonnage, with a consequent reduction of fixed charges per ton and profits on steel produced during the periods when otherwise the furnace would be out of commission for general repairs.

This construction has been in use about a year and a half at the works of the Lackawanna Steel Co., at Buffalo, and for seven months at the South works of the Illinois Steel Co., and of the Grand Crossing Tack Co. One furnace has already made some 600 heats with no repairs beyond occasional patching of the side walls. The original roof is in practically as good condition as when it started.

The port was originally designed to eliminate port troubles in furnaces operated on producer gas, but it can be operated equally successfully with natural gas or oil. It is also applicable to heating furnaces wherever the conditions are such that the ports give trouble. This port is built by the Blair Engineering Co., of New York and Chicago.



PLAN, SECTIONS AND ELEVATIONS OF THE BLAIR OPEN-HEARTH FURNACE PORT AND BULK HEAD.

The W. S. Tyler Co., Cleveland, has awarded contracts for a foundry building and core ovens, the mason work being let to Andrew Dall & Son, and the steel work to the National Iron & Wire Co.

BOOK REVIEWS

An Introduction to the Study of Electric Engineering. By Henry H. Norris. New York. John Wiley & Sons. 6 x 9 inches. 404 pages. Illustrated. Cloth. Supplied by THE IRON TRADE REVIEW for $2.50.

This book, as its title implies, is an introduction purely to the science of electrical engineering. It does not propose to fill the place of a text book on the subject in that it lays down final rules for design of electrical apparatus. It is more a birds-eye-view of the entire subject written in simple, although necessarily somewhat technical language, such as would be understood by the student contemplating or engaged in the study of electrical engineering. The plan of the book is to take the familiar everyday applications of electricity, such as the trolley car, the electric light and the

telephone and reason from them to the causes producing the effects noted in these applications. The book gives a comprehensive idea of the scope of this science, and a prospective student after having read it will have a much clearer idea of the reasons governing many of his studies than is usually the case.

The book is divided into 13 chapters and an appendix. The first chapter is a brief historical synopsis of the development of electrical engineering and traces rapidly the progress made since the time of Dr. Gilbert in the 16th century down to the present time. Chapter II is a discussion of fundamental magnetic and electrical quantities, and gives a clear definition, illustrated where possible, of all of the ordinary terms used in the measurement of electrical and magnetic circuits. The materials of electrical engineering form the subject matter of chapter III. This chapter is divided into practically three sections, devoted respectively to conducting materials, magnetic materials, insulating and dielectric materials. The properties, both physical and electrical, of the various materials are discussed and their application illustrated in many cases by examples drawn from practice. Chapter IV outlines the various types of electric circuits, such as outdoor and indoor circuits, taking up under the former headline construction, pole and tower lines, and conduits, and under the latter open and conduit wiring. This is followed by a discussion on the design and operation of circuits, in which the various quantities affecting both direct and alternating current circuits are discussed, and practical application of the laws shown. The magnetic circuit in chapter V is similarly treated. Chapters VI to X inclusive deal with the construction and operation of various electrical apparatus, including generators, transformers, motors and power stations. The general principles underlying the construction of dynamo-electric machines are set forth and illustrated, both by diagrams and drawings of actual machines. A rather valuable feature of the chapter on motors is the section showing the characteristics of various types of electric motors and the application of each type. Chapter XI treats of electric lighting by means not only of the ordinary carbon filament and arc lamps, but also of the various vapor and metallic filament lamps which have lately come into use. Chapter XII relates to electrical measurements and describes the instruments used, while chapter XIII is devoted to the transmission of intelligence, including telegraphy, wireless telegraphy, telephony and the telautograph. The appendix shows the field of application of both alternating and continuous current. The book while intended primarily for the use of electrical engineering students contains much information that would be of value to the lay reader who would have a better understanding of the various features of every day life after a perusal of its pages, and the language of the book is not too technical for such a reader to understand.

Profit Making Management. By Geo. W. Carpenter. New York. *The Engineering Magazine.* 146 pages. 6 x 8¾ inches. Cloth. Supplied by THE IRON TRADE REVIEW for $2.

This little book is one that should be in the hands of the management of every shop and factory. It treats of the various elements upon which profits and losses in manufacturing depend, beginning with the reorganization of a run-down concern, and discussing briefly all of the modern methods of reducing costs. Those managers who have been reading the literature on this general subject for the last ten years will probably not find anything especially new in this book, but its author has gathered together in a brief compass, a description of nearly all of the modern methods of cost keeping. Among the chapter headings are: The Committee System, Necessity of Reports, The Designing and Drafting Department, The Tool Room, Minimizing the Time of Operations, High Speed Steel, Determination of Standard Time for Machine Operations, Handling the Work and Assembling, Stimulating the Production by the Wage System, Stock and Cost System, The Upbuilding of a Selling Organization, An Effective Organization in the Executive Department.

The up-to-date manager, is, of course, acquainted with all of the subjects herein treated, but it would pay him to glance at this book two or three times a year at least to refresh his memory in regard to a thousand and one details of management.

The American Machinists' Handbook and Dictionary of Shop Terms. By Fred H. Colvin and Frank A. Stanley. New York. The Hill Publishing Co. 513 pages. Illustrated. 4¼ x 7 inches. Flexible morocco. Supplied by THE IRON TRADE REVIEW for $3.

This most useful little book is a compilation of information frequently required in the drafting room or shop, which is seldom remembered and not usually available when wanted. The book is essentially a shop reference book, and does not take the place of the standard engineering handbooks. It treats almost exclusively of problems of the shop, which are not covered in the more pretentious reference books. The subject matter of the book, as taken from the table of contents, covers screw threads, twist drills and taps, files, work benches, soldering, gearing, milling cutters, grinding and lapping, screw machine tools, speeds and feeds, punch press tools, bolts, rivets and screws, calipering and fitting, tapers and dovetails, shop and drawing room standards, including jigs, tables of dimensions of standard machine parts and miscellaneous tables, wire gages and stock weights, steel and other metals, belts and shafting, shop trigonometry and a dictionary of shop terms. The different tools treated in the book are described, their proportions given, both by means of formulae and tables of dimensions and the limits of operation of the tools are presented. Speeds and feeds of the different types of cutting tools are given, and various rules, which will be of aid in performing many shop operations are clearly set down. The tables are specially complete and present in compact form a great deal of information which is oftentimes needed in a hurry in the shop. The book should have a wide application and prove of great usefulness in its intended field.

"Patents as a Factor in Manufacturing." By Edwin J. Prindle. New York. Engineering Magazine. 5¼ x 7¾ inches. 134 pages. Cloth. Supplied by THE IRON TRADE REVIEW for $2.

The purpose of this volume, as indicated in the preface, is to convey to inventors and manufacturers the nature of a patent and the protection it may afford, and the advantages which it may possess for meeting certain commercial conditions. It also outlines the safety which may be secured in relations between employers and employes in regard to inventions and the general rules by which the courts will proceed in upholding the patent. This book comprises seven chapters, the scope of each being practically one of the subjects above outlined. It sets forth concisely all that it is necessary for the layman to know regarding patents, both in regard to the steps necessary to obtain one and how to protect the patent after it is granted. It does not, however, attempt to make an inventor his own patent lawyer, and strongly urges that good legal advice be ob-

tained in the application and defending of patents. The light in which courts look on various patent defences in infringement cases and the rules governing priority of invention, as seen by the courts, are also clearly set forth.

THE SEVENTH INTERNATIONAL CONGRESS OF APPLIED CHEMISTRY.

A meeting of the joint organizing committee of the above congress was held in the rooms of the Chemical Society at Burlington House, London, on Friday, Feb. 5. The honorary secretary of the congress presented a report giving details of the progress made since the last meeting of the committee in June, 1908. As regards funds, it was stated that £4,400 had been received in response to a special appeal issued in December, and that £187 had been paid for membership fees. Several members of His Majesty's government have accepted the office of honorary vice presidents of the congress, including Lord Morley (secretary of state for India) and the Rt. Hon. Robert James Haldane (secretary of state for war).

The Society of Chemical Industry, which numbers over 4,000 members, has arranged to hold its annual meeting for 1909 in London, on May 26, the day preceding the opening of the congress, and the London members of this society have also arranged to entertain the members of the congress on the evening of May 29.

The foreign and colonial governments, and the leading scientific and technical societies have been asked to appoint delegates to represent them at the congress. These delegates will rank as honorary and as ordinary members of the congress respectively. The executive committee have drawn up a set of rules, given below, regarding the printing of papers for circulation among the members, before the congress meets. Copies of these rules have been sent to each sectional secretary, and to the foreign committees formed for the purpose of furthering the work of the congress. The following countries have signified their approval of the rules: America, Austria, France and Servia.

The subscription for members has been fixed at 20 shillings. The address of the general secretary is 10 Cromwell Crescent, South Kensington, London S. W., from whom all information may be obtained.

Regulations Governing the Acceptance and Printing of British Papers Before the Meeting of the Congress.

1. Any paper offered may be read, provided that the time limit be adhered to.

2. The time-limit be fixed by the president of each section.

3. No paper will be printed which has already been published.

4. The secretaries of sections shall exercise their right of considering papers submitted to them and of recommending to the publication committee such papers as are, in their opinion, worthy of being printed.

5. Papers eligible for printing before the congress must be received not later than two months before the date of meeting, and the authors of such papers shall be requested to supply a short abstract of the papers with the original manuscript.

THE MEETING OF THE AMERICAN ELECTRO-CHEMICAL SOCIETY.

The annual meeting of the American Electro-Chemical Society will be held at Niagara Falls, New York, May 6-8. The meeting will be of particular interest to the iron and steel industry, inasmuch as the electric furnace and its adaptation to steel making will be thoroughly discussed. A paper will be sent by Gustave Gin, of Paris, who is the inventor of several types of electric furnace used in the manufacture of calcium carbide, ferro-alloys and steel. John Hay, manager of the Grondal Kjellin Co., Ltd., has promised that a paper will be sent by Dr. Kjellin, inventor of the Kjellin furnace. This paper will include many interesting data on the new 8-ton Rochling-Rodenhauseer steel furnace at Volklingen, Germany. Paul Girod, inventor of the Girod steel furnace, which is little used in this country, although it has been extensively exploited in Europe, will also prepare a paper. A paper on the Heroult steel furnace is expected from Robert Turnbull, Dr. Heroult's chief engineer. In addition to these papers, others are expected from the principal manufacturers, on the electro-metallurgy of iron and steel, as Kellar and Stessano. Dr. Eugene Haanel has also been invited to read a paper.

William Arnold, Oakley W. Cook and John R. Lee, receivers, have been named by a federal court at Trenton, N. J., as special masters to proceed in foreclosure of the $2,500,000 mortgage held by William J. Blauvet, trustee, against the Passaic Steel Co.

SASH WEIGHTS AND MALLEABLE SCRAP.

By W. J. Keep

Question:—Machinery scrap is difficult to secure at the present time in our vicinity and is quoted at $14.00 a ton; stove plate scrap is held at $11.00 and malleable and steel scrap can easily be obtained at about $8.50. We want to use malleable and steel scrap in our cupola for making sash weights. What kind of flux should we use and we would like to have the chemical analysis of limestone which can be used to advantage for this work. Will the introduction of steam into the blast pipe give us good results? What is the relation between the sizes of the upper and lower tuyeres, and what space should be left between the two? We have made castings of malleable scrap entirely, but they have invariably cracked while they were being poured. How can we use malleable or steel scrap successfully?

Answer:—For machinery castings you cannot use more than 25 per cent of steel scrap and no malleable. You should use about an ounce of aluminum to 100 pounds of iron in the ladle to prevent blow holes. Sash weights are usually made of discarded tin cans which are baled, but the iron has a white fracture and has little strength. To increase the strength of your malleable and steel scrap mixture and to make it fluid, stove plate scrap can be used to advantage. This iron should be raised to a high temperature as it rapidly loses its fluidity in the ladle. The limestone should be absolutely free from sulphur and should contain more than 80 per cent of lime. Weathered stone gives the best satisfaction in cupola practice, inasmuch as limestone from a deep quarry rarely contains more than 50 per cent of lime, and is not an ideal cupola flux. Steam introduced in the blast pipe will give dull iron. I would suggest closing the upper tuyeres, flaring the lower tuyeres as wide as possible on the inside. Malleable scrap will not make gray castings.

The Susquehanna Iron Co., successor to the Susquehanna Iron & Steel Co., is exchanging new 20-year bonds for the old company's 6 per cent bonds, of which there is an amount of $300,000 outstanding. When affairs are finally adjusted, it is said that there will be something left for stockholders.

THE PROPORTIONS OF BLAST FURNACES.

In a letter to *Engineering News*, O. V. de Gaigne gives the table of proportions of typical blast furnaces, which is reproduced herewith. The names of parts used in the table are defined in the sketch. The nominal capacities are computed by the empirical formula

$$C = \frac{H \times D^2}{100}$$

in which C is the capacity in tons output per day, H the over all height, and D the bosh diameter. The omission in the table of the height of the lower shaft indicates the absence of that section in the furnace. The

omission of the location and number of tuyeres in some instances is due to the inability to obtain these data.

In the table furnace No. 21 has a cylindrical upper shaft 8 feet high; No. 17 has one 9 feet 7/8 inch high; No. 4 has a conical upper shaft 7 feet 2½ inches high, large diameter 13 feet 1 inch, diameter at top 12 feet, 1 inch. No. 24 has an upper shaft 8 feet high, as have also furnaces 22 and 23.

The Consolidated Equipment Co., Indianapolis, Ind., of which E. V. Abbott is general manager, and R. A. Ekstrom engineer, was recently incorporated to handle both new and refitted equipment including machinery and supplies for factories, mines, railroads, etc., and water softening and purifying systems as well as sewage disposal plants. Mr. Abbott was for six years Indianapolis house manager for Fairbanks, Morse & Co.

At the annual meeting of the Empire Steel & Iron Co., held at Jersey City, two new directors were elected, C. H. Zehnder and E. L. Stanley, the latter of the Title Guarantee & Trust Co., New York. The annual report was not made public.

COMPARATIVE TABLE OF BLAST FURNACE DIMENSIONS.

	Name and Owner.	Approx. nominal capacity in tons per day.	Capacity in cu. ft. Hearth.	Bosh.	Shaft.	Total.	Over all height.	Diameter Hearth.	Bosh.	Top.	Height Hearth.	Bosh	Lower shaft.	Shaft.	Stockline to top.	Cinder notch.	Tuyeres.	No. of tuyeres.	No. of furnace.
							ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.			
1.	Newburg No. 3; Am. Steel & Wire Co.	156	760*	1,189	5,338	7,287	60 8	10 6	16 ..	10 6	7 8	8 6	.....	38 2	6 4	4	7	..		1
2.	Milwaukee Nos. 1 and 2; Illinois Steel Co.	169	505*	1,587	6,472	8,564	66	9 6	16 ..	12 6	6 6	12 2	4 2	35 2	8	3 3	4 9	7		2
3.	North Works Nos. 1 and 2; Illinois Steel Co.	169	515*	1,627	5,843	7,985	66	9 6	16 ..	11 6	6 6	12 6	.....	39	8	3 3	4 9	7		3
4.	Union No. 3; Illinois Steel Co.	170	630*	1,246	6,866	8,742	72 5'	10 ..	15 4	13 1	7 4½	9 9	12	23 7½	10	3 9	6	..		4
5.	Union No. 4; same as above.	172	610*	1,342	7,093	9,045	73	10 ..	15 4	12 ..	7 1½	10 6	10 10½	34 6	10	3 9	5 9	..		5
6.	Emma No. 4; Am. Steel & Wire Co.	210	996*	1,556	8,067	10,619	72 7½	12 ..	17 ..	12 1½	7 7½	9 4	.....	45 6	10 2	4	7	..		6
7.	Franklin	253	680	2,200	8,500	11,380	74 0¼	10 9	18 6	13 3	7 6¼	13 2	.....	43 4	10	4 3	.....	12		7
8.	Thomas; Thomas Furnace Co., Milwaukee.	255	680	2,170	9,180	12,030	76 2¾	10 8	18 3	13 ..	7 6¼	11 3¼	.....	47 5¼	10	4	.....	16		8
9.	Shenango, & Neshannock	258	718	2,550	8,750	12,018	75	11 ..	18 6	14 ..	7 6¼	15	.....	42 5¾	10	4	.....	16		9
10.	Steelton; Pennsylvania Steel Co.	272	910	2,220	9,370	12,500	84	11 6	18 ..	13 6	8 9	13	.....	48 3	10	5	.....	10		10
11.	Bellaire No. 2; Carnegie Steel Co.	272	800	2,725	9,350	12,875	75 2	12 6	19 ..	13 8½	6 6	14	.....	44 8	10	3 3	.....	12		11
12.	Sharon No. 2; Carnegie Steel Co.	273	670	2,020	10,480	13,170	84 6	11 ..	18 ..	13 6	7 0¼	12	.....	53 5¾	10	3 10½	.....	12		12
13.	Bellaire No. 1; Carnegie Steel Co.	275	800	2,130	10,160	13,090	76	12 6	19 ..	13 6	6 6¼	11	.....	48 5¾	10	3 3	.....	12		13
14.	Iroquois; Iroquois Iron Co., South Chicago, Ill.	291	728	2,408	11,675	14,811	85	11 6	18 6	13 9	7	13	.....	57 7	10	4	.....	12		14
15.	Joliet No. 1; Illinois Steel Co.	312	1,266*	2,279	11,477	15,022	77 11¾	13 ..	20 ..	14	8 9	10 6	8	35 8¾	10	4 6	7 3	..	10†	14
16.	Joliet No. 2; same as above.	312	1,266*	2,713	10,849	14,828	77 11¾	13 ..	20 ..	14	8 9	12 6	6	35 8¾	10	4 6	7 3	..		15
17.	Joliet No. 2; same as above.	322	1,545*	3,290	12,316	17,151	84 0⅞	14 ..	21 ..	14 3	8 6	13 6	5	37 7	10	4 6	7 6	..		16
18.	Rosena	388	1,250	2,850	15,210	19,310	97 0¾	13 ..	20 ..	16	9 4⅞	13 1½	.....	59 6¾	15	4 10⅝	.....	16		18
19.	Edith; American Steel & Wire Co.	388	1,324*	2,849	15,990	20,163	97 0¾	13 ..	20 ..	16	9 4⅞	13 1½	5 10⅛	56 8¾	12	4 10⅝	7 10¾	..		19
20.	Central Nos. 1 and 2; Am. Steel & Wire Co.	435	1,644*	2,112	16,836	20,592	90	15 6	22 ..	15	7 6	12 1½	.....	61 10¾	8 5¾	4	7 6	..		20
21.	Central No. 5; same as above.	450	1,580*	3,349	16,789	21,718	97 2⅛	14 6	21 6	15	8 2	13	.....	58 01⅛	9 10	4	7 6	..		21
22.	South Works No. 9; Illinois Steel Co.	460	1,953*	3,471	17,274	22,698	95	15 9	22 ..	16	9 2½	12 3½	10	41 6	14	4 6	7 6	..		22
23.	South Works No. 10; same as above.	460	1,946*	2,870	18,347	23,163	95	15 6	23 ..	16 6	9 2½	12 3½	10	43 6	14	4 6	7 6	11		23
24.	Neville Island; Am. Steel & Wire Co.	462	1,575*	3,305	17,255	21,835	100	15 ..	21 6	15	8 3	12	.....	60	10 9	4	7 6	..		24
25.	Lorain No. 1; National Tube Co.	484	1,420	4,825	16,400	22,645	100	14 6	22 ..	14 6	8 6	18 6	.....	63	10	4	7	16		25
26.	Lorain No. 2; same as above.	484	1,320	5,025	18,000	24,345	100	14 6	22 ..	15	8	19 3	.....	62 9	10	4	7	16		26
27.	Newcastle No. 4; Carnegie Steel Co.	560	1,500	3,376	21,210	26,086	106 2	15 ..	23 ..	17	8 6	15 8	.....	67	15	5	.....	16		27
28.	Ohio Nos. 1 and 2; Carnegie Steel Co.	565	1,500	4,505	21,310	27,315	106 5⅝	15 ..	23 ..	17	8 6	15 8	.....	67 3⅝	15	5	.....	16		28
29.	Ohio No. 3; same as above.	565	1,710	3,265	21,790	26,765	106 6	16 ..	23 ..	16	8 6	15 8	.....	72 2¼	15	5	.....	16		29
30.	Mingo Nos. 2 and 3; Carnegie Steel Co.	565	1,710	3,220	21,600	26,540	106 6	16 ..	23 ..	16	8 6	10 9¾	.....	72 2¼	15	5	.....	16		30

*Includes volume of hearth-sole. †Six inches diameter.

A MOTOR-DRIVEN HIGH DUTY SHAPER.

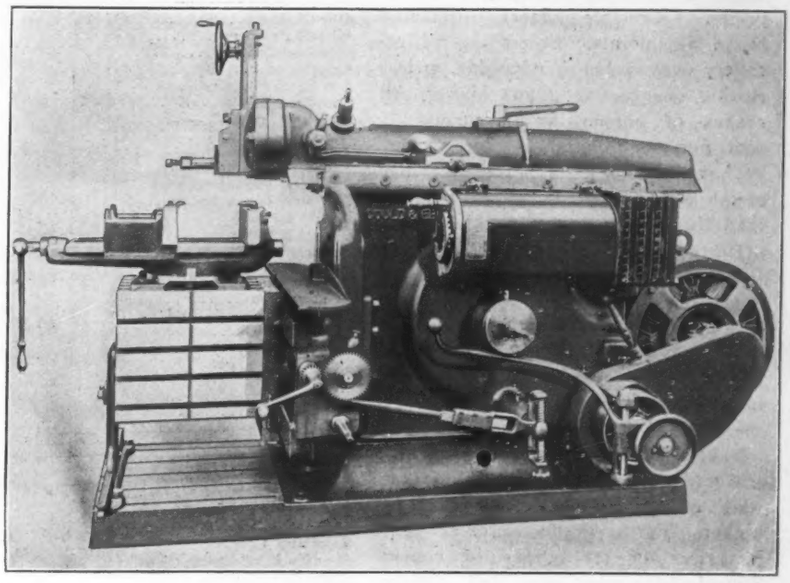
The application of individual motors to machine tools is universally admitted to be the best method of applying power in a great many of cases, but extravagant claims have been made by irresponsible persons which have caused some misunderstanding as to the true worth of individual motors. Some unsatisfactory installations have been made by inexperienced men which have caused dissatisfaction. But in spite of such mistakes the general manufacturing tendency has been to install individual electric motors on machine tools with due regard to the small details which determine whether an installation shall be entirely satisfactory or not. The accompanying illustration shows an individual motor-driven shaper as installed in a well known machine shop, and which is thoroughly satisfactory because attention has been paid to all the different items pertaining to motor drive.

The tool is a 34-inch, quick stroke, high-duty shaper manufactured by Gould & Eberhardt, Newark, N. J., and the motor is a direct-current, adjustable speed, type "SA" Westinghouse 5-horsepower motor. The speed may be adjusted by a standard Westinghouse drum controller over a range of 400 to 1,600 revolutions per minute in a series of 15 forward and six reverse speeds. The latter are provided for use in making the preliminary adjustments where it may be necessary to reverse the motion of the ram. Connection between the motor and the shaper is made by a Morse silent chain protected by a chain guard. The motor is conveniently located on the rear of the shaper housing which makes the outfit a most compact unit free to be located at any point in the shop.

These three items mentioned above constitute the important points to be considered in making the application of a motor. The correct choice of the capacity of the motor is frequently allowed to overshadow these questions. The use of the adjustable speed motor with this wide speed range does away with the necessity for mechanical speed changes and gives a much greater number of steps than is possible by other methods. This permits setting the speed much nearer the correct value for any given piece of work than is possible when mechanical speed changes are depended upon. Inasmuch as the tool has a reciprocating motion and hence is not cutting on the back stroke it is essential that it should be run at as high a speed as it can stand, to secure the most economical production.

The selection and location of the controller is an extremely important feature as the convenience of control determines in part the productive capacity of the machine. It is not sufficient to try to speed the tool up to its maximum while working, it is perhaps more important to reduce the idle time of the machine between jobs, by making the convenience greater. Here a controller has been selected with a large range of speed notches, any one of which may be used for running, and has been located on the right hand side of the machine, just above the various handles by which the adjustments of the feed and stroke of ram are made. While there is room for argument whether the rotary motion of the drum controller handle or the straight line motion of the handle on a face plate type of rheostat is the more convenient to the workman, there is no question but that the workman can adjust all of the conditions without moving out of his position. The use of a chain to transmit power to the shaper might be expected to be unsatisfactory because of the reciprocating motion of the head. But as a matter of fact the heavy gear wheel which carries the crank of the shaper acts as a fly wheel and overcomes the fluctuation so that the chain runs very smoothly and without perceptible vibration. The method of connection eliminates belt slippage and provides a positive drive.

Particular attention is called to the clutch and brake device controlled by the long curved lever, shown below the controller, by means of which the shaper may be instantly stopped without stopping the motor. This saves time in setting, adjusting and examining the work and also lessens the wear and tear on the motor which would result if it were necessary to stop and start the motor for every little adjustment. Whenever the shutdown is for any but a very short time, the controller is thrown to the off position and the entire outfit brought to a standstill.



A Motor-Driven High Duty Shaper.

Installing Mullen Washers.—The third Mullen blast furnace gas washer is being installed by the National Tube Co., at its Lorain plant, and the second Mullen washer is now operating at the Woodward furnaces, Woodward, Ala. The Thomas Iron Co., at Hokendauqua, and the Struthers Furnace Co., at Struthers, O., are installing these washers, while the Ruddiman-Mullen combined dry dust catcher and gas washer is being installed at the Crane Iron Works, Catasauqua, Pa. At the new stack of the Bethlehem Steel Co., at South Bethlehem, Pa., the Mullen washer is also being added.

Stocks Gradually Recover from Slump.

February, the shortest month of the year, and shortened further by three stock exchange holidays, has been filled by developments of various relative importance in finance and general business.

Although Monday was a holiday, cables from London showed that American securities were weak and lower. Tuesday's market was demoralized, and sales of more than 1,500,000 shares of stock broke prices from one to 10¾ points. Foreign markets were weak, English consols declining to near the year's low prices. Crucible Steel preferred broke 5¾ points. Something of recovery was noted Wednesday, prices closing one to five points higher. All grades of copper were reduced ¼ cent per pound, and an "open market" was declared on p'g lead, which metal was quoted at ⅝ cent lower than three weeks ago. Crucible Steel preferred rallied sharply, but the Westinghouse stocks were weak and lower. While Thursday's market was less active, it was reactionary, stocks closing ½ to 1¼ point lower. Copper stocks were weak, and Amalgamated broke to the lowest prices of the year. Crucible Steel preferred advanced two points. Friday's market was less active, but the tone was firmer, and prices closed higher. Further reduction was made in prices of all grades of copper. Saturday's market was dull and irregular, industrial stocks closing somewhat higher, but railroads a little lower.

Call money during the week ranged from 1½ to 2¼ per cent, with little activity. Time money was liberally obtainable throughout the week. The actual statement of clearing house banks showed a decrease of $8,500,000 in total reserve, and a decrease of about $2,300,000 in surplus reserve. The actual condition of clearing house banks was reported as follows: Loans decreased, $5,360,700; deposits decreased, $10,663,100; the percentage of reserve, 26.01, showed a decrease of 0.18. The statement of non-member banks and trust companies showed loans decreased $17,736,700; net deposits decreased $26,522,400; and the percentage of reserve, 19.1, an increase of 0.7. The American Railway Association bulletin gave the total surplus of idle cars on Feb. 17 as 301,441, an insignificant decrease of 130 cars.

Commercial failures for the week were 270, compared with 278 the preceding week and 328 the corresponding week last year. Shares were dealt in to the number of 4,763,800, compared with 3,439,860 the preceding week and 1,614,710 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $23,095,000, compared with $29,899,000 the preceding week, and $14,008,000 the corresponding week last year.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Feb. 27	Changes in Week	Date 1909 Ann. M't'g.	Stock Outstanding	Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	13½	— ¾	Sept. 2	$19,820,000		.....	.....
Allis-Chalmers pr	41	—4⅜		16,150,000	7 cum	1¾ Q.	Feb., 1904
American Can	8	.....	Feb. 2	41,233,300		.....	.....
Am. Can pr	73⅛	—1⅜		41,233,300	7 cum	1¼ Q.	Jan., 1909
Am. Car & Foundry	47¼	+ ¾	June 24	30,000,000		½ Q.	Jan., 1909
Am. Car & Fdy pr	109	—1⅜		30,000,000	7 n. c.	1¾ Q.	Jan., 1909
American Loc	51½	+ ½	Oct. 19	25,000,000	5	1¼ Q.	Aug., 1908
American Loc. pr	110	—2		25,000,000	7 cum	1¾ Q.	Jan., 1909
American Ship	58⅞	+ ⅞	Oct. 13	7,600,000	4	1 Q.	June, 1908
American Ship pr	105	.....		7,900,000	7 n. c.	1¾ Q.	Oct., 1908
Am. Steel Foundries(new)	35	—1⅛	Dec. 2	17,184,000		.....	.....
Am. Steel Foundries, pr	47½	.....		17,240,000	6 cum	1	Aug., 1904
Barney & Smith	40	.....	June 1	2,000,000	4	1 Q.	Sept., 1907
Barney & Smith, pr	95	.....		2,500,000	8 cum	2 Q.	June, 1908
Bethlehem Steel	21¼	— ¾	April 6	14,862,000		.....	.....
Bethlehem Steel, pr	48	—1½		14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	35	— ⅛	March 16	45,000,000*	6	1½ S. A.	Feb., 1909
Cambria Iron	46	.....		8,468,000*	4	2 S. A.	Sept., 1908
Chicago Pneumatic Tool	25	.....	Feb. 15	6,145,800	4	1 Q.	Oct., 1907
Colorado Fuel	32	+ ½	Oct. 18	34,235,500		3½	April, 1902
Crucible Steel	7½	.....	Oct. 20	24,578,400		.....	.....
Crucible Steel, pr	57¼	—1¾		24,436,500	7 cum	1 Q.	Dec., 1907
Empire Steel	6	.....	April 27	1,254,770		.....	.....
Empire Steel, pr	47	.....		2,500,000	6 cum	1½ S. A.	Jan., 1909
Fay & Egan	100	.....	Feb. 18	1,000,000	6	1¾ Q.	Nov., 1908
Fay & Egan, pr	100	.....		1,000,000	7 cum	1¾ Q.	Nov., 1908
General Electric	154	+1½	May 11	65,178,800	8	2 Q.	Jan., 1909
Harbison-Walker	17	.....	Jan. 18	18,000,000		½	Oct., 1907
Harbison-Walker, pr	81	—1		9,600,000	6 cum	1½ Q.	Jan., 1909
International Pump	35½	—1½	June 8	17,762,500		1	April, 1903
International Pump, pr	83¾	— ⅞		11,350,000	6 cum	1½ Q.	Feb., 1909
Lackawanna Steel	30	—10	March 10	34,971,400		.....	.....
Lake Sup. Corp	19	.....	Oct. 6	40,000,000		.....	.....
New York Air Brake	82½	—2½	June 17	8,012,500	8	2 Q.	Oct., 1907
Niles-Bement-Pond	100	.....	Feb. 3	8,500,000	6	1½ Q.	Mar., 1909
Niles-Bement-Pond, pr	100	.....		2,000,000	6 cum	1½ Q.	Feb., 1909
Otis Elevator Co	49	—1	March 15	6,375,300		1½ S. A.	April, 1908
Otis Elevator Co., pr	94	— ½		6,295,000	6 n. c.	1½ Q.	Jan., 1909
Penn. Steel	50	.....	May 10	10,750,000		.....	.....
Penn. Steel, pr	103	— ½		16,500,000	7 n. c.	3½ S. A.	Nov., 1908
Pittsburg Coal Co	10¼	—2	March 9	28,104,600		.....	Nov., 1906
Pittsburg Coal Co., pr	40¼	—5¼		27,071,800	7 c.	1¾	April, 1905
Pressed Steel Car	33¾	— ¼	Feb. 17	12,500,000		3	Aug., 1904
Pressed Steel Car, pr	96	—2		12,500,000	7 n. c.	1¾ Q.	Feb., 1909
Pullman	170	—1½	Nov. 10	100,000,000	8	2 Q.	Feb., 1909
Railway Stl. Spring	41½	—1	March 4	13,500,000	4	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	99½	— ½		13,500,000	7 cum	1¾ Q.	Dec., 1908
Rep. Iron & Steel	19½	+1¼	Oct. 20	27,191,000		.....	.....
Rep. Iron & Steel, pr	72½	—3		20,416,900	7 cum	1¾ Q.	April, 1908
Sloss-Sheffield	72	+ ¾	March 10	10,000,000	5	1¼ Q.	Mar., 1909
Sloss-Sheffield, pr	108	+ ⅜		6,700,000	7 n. c.	1¾ Q.	Jan., 1909
U. S. Pipe & Fdy	25	—1½	June 23	12,500,000	4	⅝ Q.	Dec., 1907
U. S. Pipe & Fdy., pr	73	.....		12,500,000	7 n. c.	1¾ Q.	Sept., 1908
U. S. Steel	44⅜	—1⅝	April 19	508,302,500	2 n. c.	½ Q.	Mar., 1909
U. S. Steel, pr	110	+ ⅜		360,281,100	7 cum	1¾ Q.	Mar., 1909
U. S. Steel 5s	103	—1		463,798,000	5	5 A.	.....
Va. Iron, Coal & Coke	57	—2	Sept. 21	9,073,680		.....	.....
Westinghouse Elec	75	—4¼	June 16	27,173,200	10	2½ Q.	Oct., 1907
Westinghouse Air Brake	106	—5¾	Oct. 5	14,000,000*		2½ Q.	Jan., 1909

Par value of shares, $100, except those starred (*), $50.

Copper Stocks.

New York.—Amalgamated Copper closed 68¼, at net loss of 4⅜.

Boston.—Butte Coalition closed 34¼, a net gain of ⅛; Calumet & Arizona closed 99, a net loss of 2; Calumet & Hecla closed 610, a net loss of 30; North Butte Mining closed 70, a net gain of ½; Quincy Mining closed 88, a net loss of 2.

Financial Notes.

The Railway Steel Spring Co. declared the regular quarterly dividend of 1¾ per cent on preferred stock, payable March 20; the North Butte Mining Co. the regular quarterly dividend of $1 per share, payable March 27; the J. A. Fay & Egan Co. declared the regular quarterly dividend of 1¾ per cent on preferred, payable Feb. 20, but passed the quarterly dividend of 1¾ per cent on common stock; the General Electric Co. declared the regular quarterly dividend of 2 per cent, payable April 15.

NEWS FROM MANY INDUSTRIES

New Buyers:—

H. T. Priestley, F. H. Ives and M. J. Dillon have incorporated the Ives Concrete Machinery Co., Galena, Ill., with $5,000 capital.

The Rio Grande Machine Shops, Brownsville, Tex., has been incorporated, with $50,000, by M. A. Newman, Jeff Lawson and T. J. Lawson.

C. F. Mitchell, F. A. Bell, C. S. Rogers, M. E. Carroll and P. J. Carroll have incorporated the Ohio Locomotive Crane Co., Bucyrus, O. The capital stock is $15,000.

The Locke Mfg. Co., Robinson, Ill., to manufacture boiler engines, with $25,000 capital stock, has been granted a certificate of incorporation. Those interested are: H. W. Locke, A. P. Woodworth and W. E. Fritz.

Articles of incorporation have been filed by the American Hoisting Machine Co., Sidney, O. C. J. Spilman, George Kraft, M. Hertzstam, G. W. Henue, P. B. Taylor are the incorporators. The capital stock is $10,000.

The Penn Chain Works, Reading, Pa., has been incorporated by Treasurer Frank T. Tibbetts, 1359 Locust street, Reading Pa. The other directors are Walter G. Steininger and Wolfarth Southall, Reading, Pa. The company has a capital of $15000.

The Coyle Mfg. Co., St. Louis, Mo., has been incorporated with a capital stock fully paid of $10,000. Those interested are: Thomas M. Coyle, John C. Rader and W. Scott Hancock. The company will manufacture and deal in machinery, patterns, etc.

A charter has been granted to the Huntington-Bargar Machine Co., Jamestown, N. Y., to manufacture engines and machinery. The company is capitalized at $5,000, and has these incorporators: William Huntington, Lewis T. Bargar and J. Delevan Curtiss, Jamestown, N. Y.

Shapiro & Terker, Inc., Brooklyn, N. Y., has been incorporated to manufacture structural and ornamental iron work, with $15,000 capital stock. The incorporators are Abraham Shapiro, 125 Martens avenue; Sandor Terker and Bertha Terker, 1027 Flushing avenue, all of Brooklyn, N. Y.

A charter has been granted to the Morrison Construction & Salvage Co., Rochester, N. Y., to manufacture bridges and structural work, with a capital of $10,000. The incorporators are: George S. Morrison, Frederick R. Morrison, Chester C. Milne, Rochester, N. Y.

The Knight Pneumatic Sander Co., Huntington, Ind., has been granted a certificate of incorporation, with $800 capital stock, to manufacture and sell a pneumatic sander for railway service. The directors are: William F. Yergens, Gertrude F. Knight and Charles E. Knight.

The Argo Supply Co., Manhattan, New York, machinist, tool maker, etc., has been chartered with $1,000 capital stock. The incorporators are Theodore Kalisher, 80 Broad street; G. Q. Dean, 1628 Amsterdam avenue, and Fred Knowlton, 527 East 147th street, all of New York city.

The Shaw Dry Gas Carburetor Co., New York city, to manufacture gas engines, has been chartered with $1,000 capital stock. The incorporators are: Robert W. Shaw, Stamford, Conn.; Gavin Rae, 370 Amsterdam avenue; and Henry I. Silverman, 174 West 137th street, both of New York city.

The National Wrench Co., New York city, has filed articles of incorporation to manufacture wrenches, nippers and tools. Those interested are: W. C. Lawson, 1 Broadway, New York city; William B. Carswell, 110 Fort Greene Place, Brooklyn, N. Y., and John T. Condon, 64 Wall street, New York city.

Articles of incorporation have been filed by the Central Heating System Co., Newark, N. J., to furnish steam power for machinery. The company has a capital of $10,000, and has these incorporators: Edwin S. Prieth, Verona, N. J.; Benedict Prieth and Charles E. C. Smith, Newark, N. J.

The Funk Machine Co., New York city, has been incorporated to manufacture machinery, engines and mechanical devices, with a capital of $50,000. The incorporators are Thomas Hill, Quincy, Ill.; Nelson E. Funk, 25 City Hall place; John B. Wentworth, 61 West 135th street, both of New York city.

A charter has been granted to the Brazil Machine & Foundry Co., Brazil, Ind., with a capital stock of $50,000, to manufacture clay working and farm fence machinery. The incorporators are D. H. Davis, Louis McNutt, Prentiss Tilley, James McClelland, George H. Cocks, Alanson Bennett.

The McKelvey Machinery Co., to deal in new and second hand machinery, with $20,000 capital stock, has been granted articles of incorporation. Those interested are: Edward P. Ehrbar, 79 Rodney street, Brooklyn; Charles J. McClain, 117 West Fifty-eighth street, and Harry C. Adams, 446 Central Park West, New York city.

The Snyder Railway Specialty Co., Manhattan, New York city, to manufacture and deal in railway specialties, with a capital of $100,000, has these incorporators: Benjamin F. Blar, Glen Ridge, N. J.; Joseph A. Burdeau, 336 West Ninety-fifth street, New York city, and Louis F. Staar, 471 Ocean avenue, Brooklyn, N. Y.

A charter has been granted to the Sirius Co., New York city, to manufacture machinery and appliances useful in electrical, mechanical, chemical and manufacturing trades, with $10,000 capital. The incorporators are R. Fulton Rubens, Mitchell F. McCarthy; Ralph J. Sachers, 2 West Twenty-ninth street, New York city.

A charter has been granted to the Arlington Stamping Co., Arlington, N. J. The company is capitalized at $25,000, and will manufacture sheet, cast and wrought metal work. The incorporators are: Robert Simpson and Jeannette Settlemeyer, Coffee Exchange building, New York city; Joseph Campbell, Arlington, N. J.

The American Steel Dredge Co., Fort Wayne, Ind., has applied for a charter. The company has $200,000 capital stock, and will manufacture and sell dredging machinery. The incorporators are: James P. Karr, John D. Rauch, John C. F. Sprankle, Perry G. Randall, Hugh C. Keegan, William A. Bohn and Christian C. Schlatter.

The Neibla Mfg. Co., Brooklyn, N. Y., mechanical and electrical engineer, machinist and metal worker, has been chartered with $50,000 capital stock. The incorporators are: Alexander Albion, 1059 Atlantic avenue; Frederick C. Lambert, 71 Irving place, both of Brooklyn; Paul Lichtenstein, 25 Broad street, New York city.

New Construction:—

The Vulcan Crucible Steel Co. has awarded to the Pittsburg Bridge & Iron Works the contract for a building 60 x 184 feet, at Aliquippa, Pa., for $80,000.

The plant of the Stout-Parke Foundry & Machine Co., Carthage, Mo., which was recently seriously damaged by fire, will be rebuilt according to present plans.

The Winnfield Iron Works, Winnfield, La., is planning to erect a brick foundry addition estimated to cost $35,000. The Ruston Iron Works

will be consolidated with the Winnfield works, and the general line of manufacture will include the molding of car wheels, building logging cars, and various lines of saw mill machinery.

The Enid Foundry Co., Enid, Okla., has begun the erection of a brick addition, two stories, 50 x 101 feet, upon which $25,000 will be expended, including new equipment.

The Union Tool Co., Coalinga, Cal., has purchased a site 50 x 150 feet, upon which it will build a machine shop. The company is planning also to establish shops at Midway and Maricopa, Kern county.

Plans are being prepared for a shop to be erected in connection with the Davenport, Ia., plant of the Davenport Locomotive Works, one story, 130 x 200 feet, brick and steel superstructure on concrete foundation.

The Chester Gray Iron Foundry Co., Chester, Pa., has awarded to S. A. Hewes, Chester, the contract for building a foundry building, 40 x 60 feet, of brick, with wing extension, 54 x 60 feet, ovens, sand shed, office building, etc.

The Janesville Machine Co., Janesville, Wis., has taken possession of its recently erected fine new offices. The plant is working the full force of men, and is shipping from 30 to 40 cars of finished material per week.

The Henry Disston & Sons Co. has awarded the contract for erecting a brick and steel machine shop, 84 x 184 feet, and a steel warehouse, 43 x 91 feet, at Tacony station, Philadelphia, for $49,600, to local contractors.

The Engineers' Specialty Co., Kansas City, Mo., has purchased a site on Fifteenth street near the Blue river, on which it will expend $15,000 for the construction of a manufactory for lubricators and machinery supplies.

The Southern Shovel Mfg. Co., Gadsden, Ala., has awarded the contract for the erection of a frame manufacturing building, to be finished in 40 days. The company plans to move machinery from Pell City to Gadsden and install it by that time.

General Manager Freeman, of the International railroad, has announced that the erection of proposed shops and round house at Taylor, Tex., will be begun as soon as the material arrives. The shops as planned will cost between $40,000 and $50,000.

The Andrews Wire & Iron Co., Rockford, Ill., has approved plans and will start the work of constructing a new building as soon as the material can be secured. The company has arranged for part of the material with the Kahn Concrete Steel Co., of Chicago.

Work is rapidly progressing on the new plant of the Pressed Steel Tank Co., West Allis, Wis. The addition will cost $30,000 and will be 120 x 250 feet in dimensions. When the plant is completed important additions to the working force of hte plant will be made.

The William Page Boiler Co., Meadville, Pa., has been forced to close down temporarily for repairs, which included relining the cupola, overhauling the core rooms, etc. The company is shipping about 100 boilers a week, and has work on the books for months to come.

The Crane Co., manufacturer of valves, fittings and pipe, Chicago, has let the general contract for a manufacturing plant to be built at Canal and Fifteenth street, Chicago. It will be 190 x 241 feet, six stories, fire proof, with a foundry on the fifth floor, and estimated to cost $500,000.

The contract for making extensive repairs to Mary stack, at Lowellville, O., has been awarded by the Ohio Iron & Steel Co. to the Meehan Boiler & Construction Co. Work has been commenced, and it is planned to complete it as soon as possible in order that the furnace may be in shape to blow in at an early date.

The Plant City Foundry, Machine & Boiler Co., Plant City, Fla., advises that it has broken ground for a plant to cost about $5,000. Contracts have been placed with Cameron Barkley & Co., of Tampa, to furnish the entire installation of American made machinery, especially specified. The company will make castings of various kinds, and do general repair work.

The Elyria Iron & Steel Co., Elyria, O., advises that it is erecting a brick addition to its finishing department, 90 x 200 feet, it being found necessary to enlarge the department in order to more readily handle the finishing end of the work. Equipment that will be added includes tumblers, brass furnaces, bending machines, etc.

The Griswold Wire Co., Sterling, Ill., is preparing to install a galvanizing plant that will be used exclusively for galvanizing wire nails and telephone wires. The company's present galvanizing plant is used only for galvanizing wire fencing, and the company intends further to increase the output of the nail department as well as to enlarge its field of manufacture of woven wire fencing.

The construction of a new building at the Reese Foundry & Machine Shops, Paris, Ill., which will be devoted to the manufacture of machinery for a new process of welding cast iron, has been commenced. The process was recently invented by Mr. Reese, Ross Mason and Bert Simmons, and it is their intention to place the machinery on the market as rapidly as possible.

The American Steel Dredge Co., Fort Wayne, Ind., which was recently incorporated with a capital stock of $200,000, has purchased a site and is planning the construction of a building 125 x 235 feet, one story, of steel and concrete construction. The company is the outgrowth of a partnership which formerly operated a plant at Logansport, Ind. It will manufacture steel dredges and steel shovels, which are largely used in trench and reclamation work.

Work has been begun by the Deemer Steel Casting Co., of which S. S. Deemer is president and general manager, converting the Triton cotton mills of New Castle, Del., into a steel casting plant. The Paxson-Deemer side blow converter process will be used. The board of directors of the new company includes: Edward T. Price, Wilmington, Del.; A. P. Witteman, G. W. Parsons and T. E. Austin, of Philadelphia, and J. V. R. Hunter, of Reading, Pa.

The Maryland Steel Co. has shipped from Sparrows Point, Md., a cargo of machinery and ore cars, structural material and steel rails for Felton, Cuba, where the Spanish-American Iron Co. is building a terminal. The Spanish-American company is the Cuban ore holding corporation of the Maryland and the Pennsylvania Steel Cos., and it is expected that several million dollars will be spent at Felton, which is the shipping point for the newly discovered ore region on the north coast of the island.

The Campbell Iron Co., St. Louis, is now building two three-story and basement warehouses, 41 x 134 feet, and one two-story, 41 x 134 feet, at 809-19 Cass avenue. On the exposed sides the windows are of metal frames and wire glass, and the walls and floors are of heavy construction. The buildings are connected by openings covered with fire proof doors, so that they can be used as practically one structure and are equipped with electric elevators. The improvements represent an outlay of about

$75,000. The company expects to occupy the new buildings in a few months, carrying a full stock of iron, steel and heavy hardware supplies for blacksmiths, machinists, horse shoers, etc.

The Leader Foundry Co., Quincy, Ill., light and heavy gray iron castings, structural iron, etc., advises that its recently noted increase in capital will be used to add a machine shop and equip the plant with the latest machinery, which improvements, it expects to have completed the early part of the coming summer. Besides doing a general line of machine work, the company will make a specialty of power presses and die work, and has associated with it an expert die maker, as well as an experienced machinist, who will have charge of the machine shop.

The newly incorporated International Malleable Steel Tie Co., which has a capital stock of $1,500,000, has taken options on three sites at Muskegon, Mich., according to Leonard W. Ashley, president and general manager. Officers will be elected at a meeting to be held in Chicago about March 15. The plans of the company include the purchase of a site of five to seven acres, upon which buildings will be erected to be completed before November. Twenty ovens will be employed in handling the product, which will include railroad ties, fish plates and T-rails, as well as a special patented apparatus for electric lines.

General Industrial:—

The Belle City Steel Castings Co., Racine, Wis., has changed its name to the Racine Steel Castings Co.

The Standard Pattern & Mfg. Co., Richmond, Ind., has filed notice of an increase in its capital stock by $20,000.

The Inter-Ocean Steel Co., of West Virginia, has been authorized to do business in Illinois with $1,000,000 of its $2,500,000 capital.

The Pennsylvania Steel Casting Co., Chester, Pa., recently completed a casting weighing 180,000 pounds, for a hydraulic hoisting machine, for Tinius, Olsen & Co., Philadelphia.

The Cheyenne Foundry & Machine Co., Cheyenne, Wyo., has been formed under the management of F. Sparks, and an old foundry plant at 2112 Bent street has been purchased. This is now being remodeled and equipped with up-to-date machinery.

At the annual meeting of the stockholders of the Standard Roller Bearing Co., Philadelphia, the directors were re-elected with the exception of M. E. Sloane, whose place was taken by Edwin Packard, president of the Federal Mining & Smelting Co.

A 60-ton fly wheel of a steam engine at the plant of the Phillips Sheet & Tin Plate Co., Clarksburg, W. Va., burst while running several days ago. The fragments badly damaged the engine and other machinery, as well as injuring several employes.

Announcement was made by the Downie-Wright Mfg. Co., Rapid City, S. Dak., builder of mining and milling machinery, that the company is under an entirely new management and has added new capital which will permit of its extending its business along broad lines.

Owensboro Shovel & Tool Co., Owensboro, Ky., has shipped to the Rock Island, Ill., arsenal the first car load on the contract of 50,000 shovels which the company has with the war department. These shovels are of special size, and are known as intrenching tools.

The Kellogg-Mackay-Cameron Co., Chicago, has purchased from William A. Cameron, who has withdrawn from the firm, the lease-hold and ground at the southwest corner of Michigan boulevard and Twelfth street, 50 x 165 feet. The consideration involved is withheld.

The Custer Sandless Casting Co., Tacony station, Philadelphia, advises that it was organized solely for the purpose of holding various patents issued and to be issued to Edgar A. Custer. Its business is not to manufacture but to license the use of its patents to manufacturers.

The Swedish Iron & Steel Co., at its annual meeting, elected these new directors: Henry S. Manning, George D. Cook, Charles H. Burke and George P. Toby. The following directors were re-elected: T. O'Connor Sloane, John H. Brewster, Lyman A. Upson, H. Stallknecht and Niles Heritz.

The Cowley Iron Machinery Co., Cowley, La., has been organized by C. E. Warren, of Chicago, with whom is associated Mr. Plain, formerly foreman of the Temple Pump Co., Chicago. The new company has taken over the business of the Champion Iron Works, and will be ready for business early in the month.

The Etna Machine Co., Toledo, O., advises that while it has just incorporated, yet it has been in business for several years. It does a general machine business giving special attention to proprietary work as well as to the making of punches, presses and drilling machines of its own design.

The Wellman Thomas Electric Co., 1444 East 49th street, Cleveland, has been organized by H. G. Wellman, formerly of the Cleveland Furnace Co., and T. W. Thomas, of the Illinois Steel Co., to install power plants complete, and handle gas engines, generators, motors, etc., as well as do wiring and rewinding, etc.

The Tennessee Coal & Iron Co., which was recently incorporated under Maine laws with a capital of $1,500,000, and of which Curtis B. Guild Jr., of Boston, is president, has been formed to develop something over 50,000 acres of coal, iron and timber lands located in Cumberland and Morgan counties, Tennessee.

The Empire Fuel & Iron Co. has incorporated under Alabama laws to conduct a general mining business with an authorized capital stock of $10,000. The officers are: President, E. B. Nelson; vice president, George A. McQueen; secretary and treasurer, Atto K. Lucas. The company's offices will be located in Birmingham.

The Star Mfg. Co., Carpentersville, Ill., finished steel shapes, advises that its recently noted organization simply had reference to the renewal of its charter which had expired. It has been in business at its present location for years, manufacturing iron and steel goods, etc., and expects to continue along the same line.

William C. Stover has been chosen president of the Fink & Anderson Engineering Co., South Bend, Ind., which manufactures gasoline engines. The company was recently re-organized. New machinery is being installed, and the company has under contract a number of engines which will be used by concrete mixing machinery companies.

The De Forest Sheet Steel Co., and the Taylor & Thomas Metal Roofing Co., Niles, O., whose organization was recently noted, has these incorporators for both companies: C. S. Thomas, Wade A. Taylor, L. H. Gilmer, W. R. Thomas, W. H. Hutchings and Myron C. Simmons. As soon as the weather will permit, work in the construction of the plants will commence.

The Marblehead Stone & Transport Co., Sandusky, was recently incorporated by a number of Youngstown, O., investors, largely identified with the Brier Hill Iron & Coal Co. They include: H. H. Stambaugh, Joseph

G. Butler Jr., R. C. Steese, John Stambaugh and Charles M. Crook. The company has a capital stock of $300,000, and will develop valuable limestone lands in the locality of Marblehead, on the Port Clinton peninsula of Lake Erie.

The Detroit Copper & Brass Rolling Mills, Detroit, re-elected these officers and directors recently: President and general manager, J. H. Jones; vice president, R. P. Joy; assistant to president, John R. Searles; secretary-treasurer, William F. Montgomery; assistant secretary, Frank H. Hoffman; auditor, Andrew J. Peoples.

The Empire Grate Co., which was recently incorporated at Chester, Pa., has organized by the election of these officers and directors: President, S. F. Dawson; secretary-treasurer, John C. Taylor; John J. Buckley and Thomas P. Dwyer. The company is preparing to move from York, Pa., and is planning the erection of a foundry at Chester.

At the recent annual meeting of the stockholders of the Albuquerque Foundry & Machine Co., Albuquerque, N. M., the following officers were elected: President, M. Gridley; secretary-treasurer, H. E. Ray; manager, William Bryce; W. O. Topping, Peter Stewart, F. M. Bullard and C. C. Davis. The company recently purchased the foundry from R. P. Hall.

The Kramer Bros. Foundry Co., Dayton, O., elected the following officers recently at its annual meeting: President, George H. Kramer; vice president, Joseph Kramer; superintendent, Bernard H. Kramer; secretary and treasurer, E. F. Loges; general manager, George Bender; sales manager, E. V. Gilbert; manager of the shipping department, James Colquist.

The Crisler Harrow Co. has leased a building at Murdock and Santa Fe avenues, Wichita, Kans., and will remove from Wellington, Kans., about March 1. A foundry will be built on land adjoining the factory. J. L. Crissler, the patentee, will devote his time to improving machinery. The plant at Wichita will be managed by J. H. Botka.

Among the recent orders taken by the Crocker-Wheeler Co., Ampere, N. J., is one for a 250-kilowatt motor-generator set for the Tennessee Coal, Iron & Railroad Co., at Ensley, Ala. It will consist of a 250-kilowatt, 275-volt, direct-connected generator driven by a 6,600-volt, three-phase, 25-cycle synchronous motor and will be used as an exciter. Another order is one for about 50 horsepower of small elevator motors purchased by the Haughton Elevator & Machine Co., Toledo, O. Yawman & Erbe, Rochester, New York, have also placed orders for a number of 2/5-horsepower motors for use on some of their specialties.

The Elkhart Brass Mfg. Co., Elkhart, Ind., recently received the second largest order in its history of six years, which calls for 20,000 lock meter gas cocks and 500 similar cocks of much larger pattern. Recently its president, A. E. Hauser, established business relations in Winnipeg, Seattle, San Francisco, Los Angeles and other Pacific coast points during a business trip.

The controlling interest of the American Bolt Co., Birmingham, Ala., recently passed from W. H. and Charles H. Merritt, of that city to Charles J. and H. C. Graham, secretary and treasurer, respectively, of the Graham Nut Co., of Pittsburg. The officers of the new company will be: President, Charles J. Graham; vice president and treasurer, Harry C. Graham; secretary, John J. Wirth, of Birmingham; assistant treasurer, Charles W. Gray, of Pittsburg. President Graham announces that considerable improvement to the Alabama plant will be made, one feature being the construction of a new building.

Charles H. Besley & Co., 1521 South Clinton street, Chicago, fine tools, seamless tubes, sheet brass, wire, etc., whose incorporation with a capital stock of $150,000 was recently noted, have these officers: President and general manager, Edward T. Wells; vice president and treasurer, K. M. H. Besley; secretary, V. Besley. The conservative policy adopted by Charles H. Besley, whose recent death was chronicled in THE IRON TRADE REVIEW, and who founded the business in 1875, will be continued by the new company under the direction of Mr. Wells, who has been associated with the company for the past 22 years, and as general manager since 1896.

Trade Notes:—

The Pacific Machinery Co., Thos. Garrett, manager, has opened headquarters and will carry a stock of machinery and mill supplies at 49 First street, Portland, Ore.

The J. M. Kohler Sons Co., Sheboygan, Wis., has opened an eastern office and show room in the Bryant Park Arcade building, New York city, which will be in charge of William H. Barth, as manager. The office is now open and all mail intended for this company should hereafter be addressed to J. M. Kohler Sons Co., Bryant Park Arcade, New York, as Mr. Stein, the former representative, ceases to act in that capacity. It is the intention of the company, for the greater convenience of the trade, to carry a stock of Kohler's superior porcelain enameled sanitary ware in New York city. Mr. Barth, who is in charge of the office and show rooms, has been identified with the plumbing supply business for a great many years and will, at the earliest opportunity, take great pleasure in renewing his many acquaintances in the trade.

The J. L. Mott Iron Works, New York, recently opened a Pacific coast branch office at 308 White building, Seattle, Wash. The Pacific coast office is in charge of H. M. Crane, formerly of Denver. The territory of the Seattle office will include all of the Pacific coast and Rocky mountain states, except California.

Fires:—

The warehouse at Wilmington, Del., occupied by Coleman B. Harris, manufacturer of gasoline engines, was badly damaged Feb. 24, the loss being placed at $30,000.

The foundry and hardware manufacturing plant of the National Novelty Co., Wrightsville, Pa., was seriously damaged Feb. 19, the loss being placed at $30,000.

The machine shops at the Stephenson mine, owned by Corrigan-McKinney & Co., near Hibbing, Minn., were badly damaged Feb. 15, entailing a loss of about $12,000, fully insured.

TRADE PUBLICATIONS.

PAINTS.—The Arlington Mfg. Co., Canton, O., has issued a booklet on various paints especially adapted to the protection of iron and steel structures. It calls especial attention to its "carbonelastic" coating, which is specially adapted to structural steel work, roofs, smokestacks, cold storage pipes, etc. In addition, a number of other paints are listed, which are of use in the iron and steel industries.

CONCRETE MIXERS.—A chain belt concrete mixer is described in a booklet just issued by the Chain Belt Co., Milwaukee. This mixer, which embodies a number of new features, is driven by means of chain belting by an engine mounted on the same base with it.

METAL PLANERS.—The Rockford Machine Tool Co., Rockford, Ill., is issuing two bulletins describing, respectively, two sizes of the Rockford metal planer.

PUMPS.—Pony Catalog No. 76 has been issued by the Dean Bros. Steam Pump Works, Indianapolis, describing briefly the wide range of pumps built by it. The pumps illustrated include boiler feed, plunger, heavy service, vertical, sinking, crank and fly wheel, pressure, fire, condenser pumps, and other types. The catalog comprises 64 3½ x 6-inch pages.

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Keeps the Engine Cylinders supplied with DRY STEAM

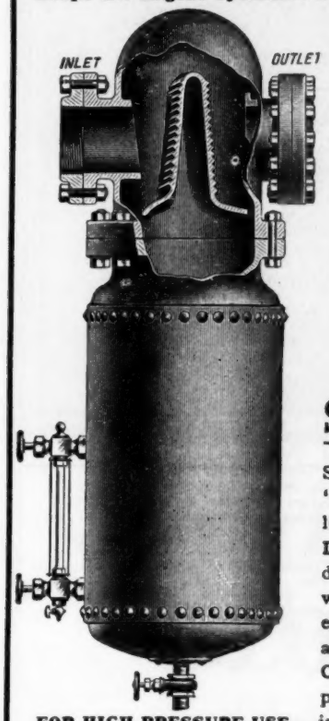

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Figure "L"
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"CYCLONE"

High-Speed Chain Hoist

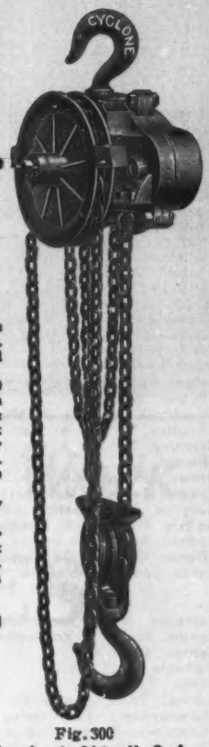

Fig. 300

The bearings of the Hoist have GRAPHITE-BRONZE BUSHINGS. They are self-lubricating, they require no oil and will run indefinitely without cutting

ALL GEARS CUT.

These hoists will raise a load of two tons to a height of one foot with a pull of 125 lb. while overhauling only 39½ feet of hand chain.

As you would have to overhaul at least 90 feet of hand chain to do the same work on the best Screw Hoists, it is plain that the CYCLONE is more than twice as fast. It can be geared to a higher speed than any other hoist with no greater hand wheel pull. There is the least possible friction loss, the efficiency averaging nearly 80 per cent.

When there is no load the hand wheel may be spun in either direction.

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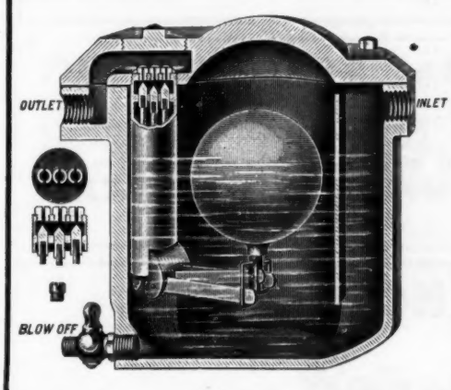

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Buffalo Foundry & Machine Co.

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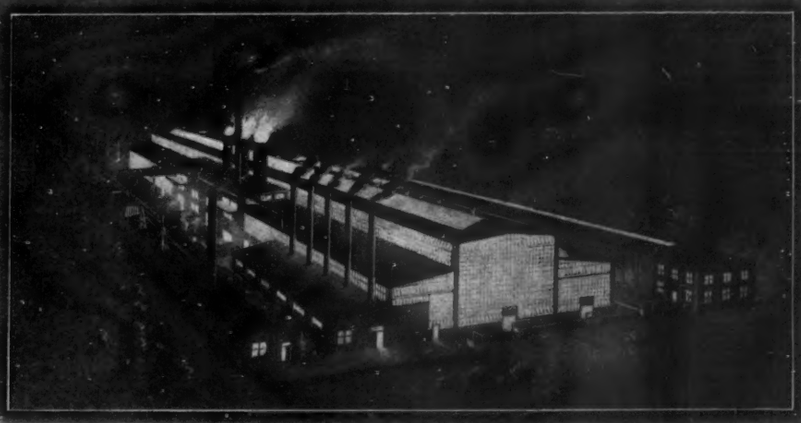

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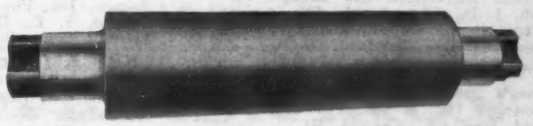

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Pratt & Letchworth Co., Buffalo, N. Y.
Ross-Meehan Foundry Co., Chattanooga, Tenn.
Standard Malleable Iron Co., Muskegon, Mich.
Union Malleable Iron Co., East Moline, Ill.
West Virginia Malleable Iron Co., Point Pleasant, W. Va.
Wisconsin Malleable Iron Co., Milwaukee, Wis.

CASTINGS (Malleable, Car and Locomotive).
Acme Steel & Malleable Iron Works, Buffalo, N. Y.
Dayton Malleable Iron Co., Dayton, O.
Jeffrey Mfg. Co., Columbus, O.
Lakeside Malleable Castings Co., Racine, Wis.
Missouri Malleable Iron Co., E. St. Louis, Ill.
Northwestern Mall. Iron Co., Milwaukee, Wis.
Ohio Malleable Iron Co., Columbus, O.
Port Huron Engine & Thresher Co., Port Huron, Mich.
Pratt & Letchworth Co., Buffalo, N. Y.
Ross-Meehan Foundry Co., Chattanooga, Tenn.
Union Malleable Iron Co., East Moline, Ill.

CASTINGS (Semi-Steel).
Birmingham Iron Foundry, Derby, Conn.
Flagg, Stanley G., & Co., Philadelphia, Pa.
Lake Erie Engineering Works, Buffalo, N. Y.
Mesta Machine Co., Pittsburg, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
United Engineering & Fdy. Co., Pittsburg, Pa.
Walker Foundry Co., Erie, Pa.

CASTINGS (Steel).
Acme Steel & Malleable Iron Works, Buffalo, N. Y.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Bucyrus Steel Casting Co., Bucyrus, O.
Curtis & Co. Mfg. Co., St. Louis, Mo.
Evans, David, & Co., Chicago, Ill.
Flagg, Stanley G., & Co., Philadelphia, Pa.
Massachusetts Steel Casting Co., Everett, Mass.
Mesta Machine Co., Pittsburg, Pa.
National Foundry Co., Erie, Pa.
Oostburg Steel Foundry, Oostburg, Wis.
Otis Steel Co., Cleveland, O.
Pratt & Letchworth Co., Buffalo, N. Y.
Prime Steel Co., Milwaukee, Wis.
Riverside Steel Casting Co., Newark, N. J.
Sharon Foundry Co., Sharon, Pa.
Solid Steel Casting Co., Chester, Pa.
Strong Steel Foundry Co., Buffalo, N. Y.
United Engineering & Fdy. Co., Pittsburg, Pa.
Wellman-Seaver-Morgan Co., Cleveland, O.
West Steel & Iron Casting Co., Cleveland, O.
Youngstown Fdy. & Mach. Co., Youngstown, O.

CASTINGS (Steel, Electrical.)
Strong Steel Foundry Co., Buffalo, N. Y.
West Steel & Iron Casting Co., Cleveland, O.

CASTINGS (Steel, Car and Locomotive).
Acme Steel & Malleable Iron Works, Buffalo, N. Y.
Bucyrus Steel Casting Co., Bucyrus, O.
Mesta Machine Co., Pittsburg, Pa.
National Foundry Co., Erie, Pa.
Otis Steel Co., Cleveland, O.
Prime Steel Co., Milwaukee, Wis.
Pratt & Letchworth Co., Buffalo, N. Y.
Riverside Steel Casting Co., Newark, N. J.
Strong Steel Foundry Co., Buffalo, N. Y.
United Engineering & Fdy. Co., Pittsburg, Pa.
Wellman-Seaver-Morgan Co., Cleveland, O.
West Steel & Iron Casting Co., Cleveland, O.

CASTINGS (Stove Plate).
Taylor & Boggis Foundry Co., Cleveland, O.

CASTINGS (Vanadium).
Mesta Machine Co., Pittsburg, Pa.
Strong Steel Foundry Co., Buffalo, N. Y.
United Engineering & Fdy. Co., Pittsburg, Pa.

CEMENT
American Refractories Co., Chicago, Ill.
Universal Portland Cement Co., Chicago, Ill.

CHAINS.
Bassett-Presley Co., Cleveland, O.
Jones & Laughlin Steel Co., Pittsburg, Pa.
Meeker Foundry Co., Newark, N. J.
Steel Car Forge Co., Pittsburg, Pa.

CHAPLETS.
Obermayer, S., Co., Cincinnati, O.
Smith, J. D., Fdry. Supply Co., Cleveland, O.

CHARCOAL.
Hillman, J. H., & Son, Pittsburg, Pa.
Smith, J. D., Fdry. Supply Co., Cleveland, O.

CHEMISTS (Analytical).
Emmerton, F. A., Cleveland, O.
Peck, Francis J., & Co., Cleveland, O.

CHEMISTS (Manufacturing).
Grasselli Chemical Co., Cleveland, O.

CHISELS (Cold).
Anderson Forge & Machine Co., Detroit, Mich.

CLUTCHES.
Brown Hoisting Machinery Co., Cleveland, O.
Dodge Mfg. Co., Mishawaka, Ind.
Farrar & Trefts, Buffalo, N. Y.
Farrel Fdry. & Machine Co., Ansonia, Conn.
Schultz, A. L., & Son, Chicago, Ill.

CLUTCHES (Induction.)
Wheeling Mold & Fdy. Co., Wheeling, W. Va.

COAL AND COKE.
Baird & West, Detroit, Mich.
Bessemer Coke Co., Pittsburg, Pa.
Blair, Reed F., & Co., Pittsburg, Pa.
Bourne-Fuller Co., Cleveland, O.
Columbus Iron & Steel Co., Columbus, O.
DeCamp Bros. & Yule Iron, Coal & Coke Co., St. Louis, Mo.
Eaton, Rhodes & Co., Cincinnati, O.
Debevoise, Anderson & Co., New York City.
Hammond-Byrd Co., Birmingham, Ala.
Hanna, M. A., & Co., Cleveland, O.
Hickman, Williams & Co., Chicago, Ill.
Hillman, J. H., & Son, Pittsburg, Pa.
Jamison Coal & Coke Co., Pittsburg, Pa.
La Belle Iron Works Co., Steubenville, O.
McKeefrey & Co., Leetonia, O.
Mohr, J. J., & Son, Philadelphia, Pa.
Mudge & Co., Edmund W., Pittsburg, Pa.
Pittsburg & Ohio Mining Co., Cleveland, O.
Rogers, Brown & Co., Cincinnati, O.
Shanklin, Jas. R., & Co., Cincinnati, O.
Stewart Iron Co., Ltd., Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Pittsburg, Pa.
Walter-Wallingford & Co., Cincinnati, O.
Washington Coal & Coke Co., Pittsburg, Pa.

COAL (Forging and Smithing).
Pittsburg & Ohio Mining Co., Cleveland, O.

COCKS (Gage).
Chaplin Fulton Mfg. Co., Pittsburg, Pa.
Jenkins Bros., New York City.
Wright Mfg. Co., Detroit, Mich.

COILS (Pipe).
Green Fuel Economizer Co., Matteawan, N. Y.
Pittsburg Valve Foundry & Construction Co., Pittsburg, Pa.

COLUMNS (Water).
Wright Mfg. Co., Detroit, Mich.

COLUMN (Water Alarm).
Wright Mfg. Co., Detroit, Mich.

COMPOUND (Core).
Obermayer, S., Co., Cincinnati, O.
Smith, J. D., Fdry. Supply Co., Cleveland, O.

COMPRESSORS (Air).
American Air Compressor Works, New York City.
Baird Machinery Co., Pittsburg, Pa.
Cameron, A. S., Steam Pump Works, New York City.
Curtis & Co. Mfg. Co., St. Louis, Mo.
Dean Bros. Steam Pump Works, Indianapolis, Ind.
Deming Bros., Salem, O.
Eynon-Evans Mfg. Co., Philadelphia, Pa.
General Electric Co., Schenectady, N. Y.
Independent Pneumatic Tool Co., Chicago, Ill.
McGowan, John H., Co., Cincinnati, O.
Mesta Machine Co., Pittsburg, Pa.
Norwalk Iron Works Co., So. Norwalk, Conn.
Scully Steel & Iron Co., Chicago, Ill.
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.
Wickes Bros., Pittsburg.
Wisconsin Engine Co., Corliss, Wis.

COMPRESSORS (Gas).
Norwalk Iron Works Co., So. Norwalk, Conn.